



Attorney Docket No. 08258.P007C

PATENT

# IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

**PERLMAN, STEPHEN G.**

Serial No.: 10/608,594

Filing Date: June 27, 2003

For: **SELF-CONFIGURING, ADAPTIVE,  
THREE-DIMENSIONAL, WIRELESS  
NETWORK**

Examiner: Mills, Donald L.

Art Unit: 2616

## Declaration Under 37 C.F.R. § 1.131

Mail Stop Non-Fee Amendment  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

I, Stephen G. Perlman, declare that:

1. All information provided in this declaration is of my own personal knowledge. All of the documents which are referred to herein and which are attached as Exhibits 1-3 to the Declaration of Bradley J. Bereznak, filed concurrently herewith, were either prepared by me, at my direction, or in response to my request, and are believed to be true and correct copies. (With respect to Exhibit 3, the original document was prepared by me and subsequently marked-up by Mr. Bereznak, as attested to in his Declaration.) In addition, all of the acts stated and relied upon herein were carried out in the United States of America.

2. I am the true inventor of the invention defined by the pending claims 45-69 of the above-identified patent application (P007C), which is a continuation of parent

patent application no.: 10/367,197 filed February 14, 2003 (P007). I have reviewed the above-identified P007C application, pending claims 45-69 of that application, as well as the parent (P007) application.

3. Prior to December 31, 2002 I conceived the idea of a repeater for a wireless network, which, in one embodiment, comprises a first transceiver operable to receive data transmitted on a first frequency channel, and a second transceiver connected to the first transceiver via a wired link, the second transceiver operable to transmit the data on a second frequency channel. In one embodiment, the wireless network further included a source device that transmits data on a first frequency channel. In still another embodiment, the wireless network comprises a plurality a plurality of repeaters arranged in a tree topology, each of the repeaters having an upstream transceiver to receive the data and a downstream transmitter to send the data across the wireless network, the upstream and downstream transceivers operating on different frequency channels, as well as a destination device that receives the data. Such a repeater and wireless network is described and claimed in the above-referenced patent application.

4. I disclosed my invention to my attorney, Bradley J. Berezna, in meetings and discussions we had during December 2002. As part of my disclosure, I also provided Mr. Berezna with several sets of slides that I prepared for presentations made to prospective investors and business partners of a company called "OnLive<sup>TM</sup>" that I was forming. These slides, which are attached to Mr. Berezna's declaration as Exhibits 1-3, illustrate inventive subject matter that was described and claimed in my above-referenced patent application.

5. For example, Exhibit 1 was a proposal I prepared for EchoStar Corporation that I presented to them on November 19, 2002. Slides 10-17 of Exhibit 1 show various embodiments of my wireless network invention with tuners, receivers, PCs, disk servers, routers and outdoor satellite dish-based receivers all communicating wirelessly. I discussed each of these slides with Mr. Berezna in an invention disclosure meeting we had on December 3, 2002. It was at that meeting that I described my invention for a Self-Configuring, Adaptive, Three-Dimensional, Micro-Cellular Network, which was to eventually be disclosed and claimed in the above-identified patent application. Later that month I gave Mr. Berezna another set of

slides that I prepared for presentation to SGS Thompson Corporation on December 12, 2002, which are attached to his declaration as Exhibit 2. Later that same day (December 12, 2002) I gave this same presentation to Mr. John Riccitiello, Chief Operating Officer and Mr. Scott Cronce, Chief Technology Officer of Electronic Arts, Inc.

6. Slides 18-20 of Exhibit 2 show my invention for a wireless network that included the use of wireless repeaters that utilize non-overlapping channels in the 2.4GHz and 5GHz bands. The repeaters are self-configuring in that they adapt to environmental conditions, i.e., when interference arises somewhere in the network transmission chain, the repeaters are operable to re-configure themselves to change their transmitting/receiving channels in order to obviate interference.

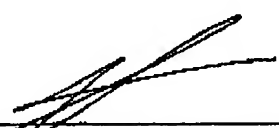
7. Shortly after I gave copies of the SGS Thompson presentation slides to Mr. Bereznak I sent him a set of new slides that I was preparing for a future presentation. These new presentation slides were given to Mr. Bereznak prior to December 30, 2002 and were then marked-up by Mr. Bereznak for use as Figures 1-23 (i.e., Exhibit 3 ) in my P007 & related P008 patent applications. Collectively, these slides show details of the subject matter of my pending claims 45-69 of the above-identified (P007C) patent application. For example, slide 16 (Figures 3 & 4) shows one embodiment using wireless repeating in a pipelined manner with each hop of the transmission chain utilizing a different channel in the 2.4GHz band. Re-transmission of digital data packets by wireless repeaters located within an interference range of another access point or repeater, with the data being delayed during transmission by one interval, is also shown in slides 18-20 (Figures 5-9). Details of the repeater architecture showing upstream and downstream transceivers is also shown in slide 40 (Figure 11). A wireless network that includes a source device that transmits data on a first frequency channel, a plurality of repeaters arranged in a tree topology, with each of the repeaters having an upstream and downstream transceivers operating on different frequency channels, and a destination device that receives the data is shown in slides 23, 25 and 27-29 (Figs. 13-19, respectively). Slides 16 and 18-20 (Figures 2-9) also show how data is transmitted from a source to a destination device via a chain of wireless repeaters, with each repeater having upstream and downstream transceivers operating on different frequency channels. Slide 20 (Figure 9) specifically shows how each packet is re-transmitted (i.e., repeated) during an

interval delayed by one interval from an interval when the packet was received. Tuner and receiver architectural diagrams are shown in slides 40, 41-43 (Figures 11, 21-23). Furthermore, the use of a wireless router, wireless repeaters, and a wireless receiver operating as described above is shown in slides 25, 27-30 (Figures 14-20).

8. Mr. Bereznak sent me a first draft of the parent patent application (i.e., his attorney docket no. 08258.P007) on January 8, 2003. I promptly reviewed the draft of the patent application and provided my comments back to Mr. Bereznak. A revised draft was delivered to me on February 12, 2003. With my approval, this revised parent application draft (P007) was filed with U.S. Patent Office on February 14, 2003.

9. I declare that, to the best of my knowledge, all statements made in this document are true, and that all statements made on information and belief are believed to be true; and further, that these statements were made with the knowledge that willful false statements are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the above-captioned application or any patent issued thereon.

Date: 2/25, 2008

  
Name: Stephen G. Perlman

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE



In re Application of:

**PERLMAN, STEPHEN G.**

Serial No.: 10/608,594

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For: **SELF-CONFIGURING, ADAPTIVE,  
THREE-DIMENSIONAL, WIRELESS  
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Art Unit: 2616

**Declaration of Bradley J. Berezna**

Mail Stop Non-Fee Amendment  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

I, Bradley J. Berezna, declare that:

1. All information provided in this declaration is of my own personal knowledge. All of the documents which are attached as exhibits to this declaration were either received by me or prepared by me (including documents received and marked-up by me), and are believed to be true and correct copies. All acts stated and relied upon herein were carried out in the United States of America.

2. I prepared and filed the above-referenced patent application (P007C) and its parent patent application no.: 10/367,197 filed February 14, 2003 (P007). The P007C application is a continuation application that claims priority under 35 U.S.C. §

120 to the earlier-filed P007 application. As the attorney of record, am submitting this declaration together with the Declaration Under 37 CFR 1.131 of Stephen G. Perlman (submitted herewith) for the purpose of removing U.S. Patent Publication No. 2004/0125820 of Rios as prior art against the above-referenced P007C patent application.

3. In late November 2002, Mr. Perlman requested a meeting with me for the purpose of disclosing several new inventions that he conceived for which he wanted to file patent applications. On December 3, 2002, I met with Mr. Perlman at my Mountain View, California office. At that meeting, Mr. Perlman disclosed to me several inventions, one of which he described as a "Self-Configuring, Adaptive, Three-Dimensional, Micro-Cellular Network". Mr. Perlman explained to me that his invention comprised a wireless network that included a chain of wireless access points or wireless repeaters operating in both the 2.4GHz and 5GHz frequency bands. The access points may be configured with two, three, or four transceivers for transmitting and receiving at multiple non-interfering frequencies. Mr. Perlman further disclosed to me that the wireless access points of his invented network were designed to adaptively re-configure their transmitting/receiving characteristics to avoid interference with other competing devices in the same frequency band.

4. At our December 3, 2002 meeting Mr. Perlman also presented me with a copy of a document entitled "OnLive<sup>TM</sup> Proposal for Echostar", dated November 19, 2002, which is attached herewith as Exhibit 1. I read this document and Mr. Perlman discussed its content with me. Afterward, I signed and dated the lower right-hand corner of the first page of this document as "Read & understood". Prior to the conclusion of our meeting, Mr. Perlman said that he would be sending me additional presentation slides in the next few weeks that he was working on which would include drawings to help explain some of the concepts he had just disclosed to me. I informed Mr. Perlman that I would take up his patent application in the order it was received; that is, I had several other patent applications related to wireless networking I was in the process of preparing for Mr. Perlman at that time. These related patent applications included my attorney docket nos. 08258.P001-P004, which were eventually filed concurrently on December 10, 2002 as application nos. 10/315,694, 10/315,624, 10/315,788, and 10/315,460.

5. About two weeks later, I received a second set of presentation slides from Mr. Perlman simply entitled "OnLive<sup>TM</sup>", dated December 12, 2002, which is

attached herewith as Exhibit 2. Shortly thereafter, I received another set of presentation slides from Mr. Perlman which showed detailed operational examples of his invention for a self-configuring, adaptive, three-dimensional, micro-cellular network. I marked-up these slides with my own handwritten notations – which notations included figure numbers and reference numerals – and sent the entire set of 23 figures via facsimile to Peter Natscher of Technical Graphics on December 30, 2002, requesting that he prepare formal patent drawings from these marked-up figures. A copy of the facsimile transmittal cover sheet and marked-up figures is attached herewith as Exhibit 3. I planned to incorporate these drawings into the patent application for Mr. Perlman's new wireless network, which case was assigned attorney docket no. 08258.P007.

6. On January 8, 2003 I mailed a completed draft patent application for P007 to Mr. Perlman along with a second patent application (attorney docket no. 08258.P008) that shared the same specification and drawings, but which included method claims rather than apparatus claims. A copy of the cover letter of that mailing is attached herewith as Exhibit 4. (Note that Mr. Perlman's street address has been redacted from Exhibits 4-6 for privacy reasons.)

7. I revised the patent applications for P007 & P008 after receiving Mr. Perlman's comments following his review of the original drafts. During the month of January 2003 I also worked on preparing several other patent applications and responses to Office Actions, which was part of my backlog of cases that I took up in chronological order. For example, one of the cases that I was working on was another patent application for Mr. Perlman, a draft of which was sent to Mr. Perlman on January 22, 2003 (Exhibit 5), and which was later filed on January 29, 2003 (assigned U.S. application no. 10/353,707). I also made revisions to the P008 application during the several weeks following receipt of Mr. Perlman's comments. After I completed my revisions to the P007 patent application I had it hand-delivered to Mr. Perlman on February 12, 2003. A copy of the cover letter for the revised draft is attached herewith as Exhibit 6. After Mr. Perlman notified me that the P007 & P008 applications were acceptable for filing with the U.S. Patent Office, I proceeded to file patent application nos. 10/367,197 (P007) and 10/367,178 (P008) on February 14, 2002.

8. I declare that, to the best of my knowledge, all statements made in this document are true, and that all statements made on information and belief are

believed to be true; and further, that these statements were made with the knowledge that willful false statements are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the above-captioned application or any patent issued thereon.

Date: 3/27, 2008

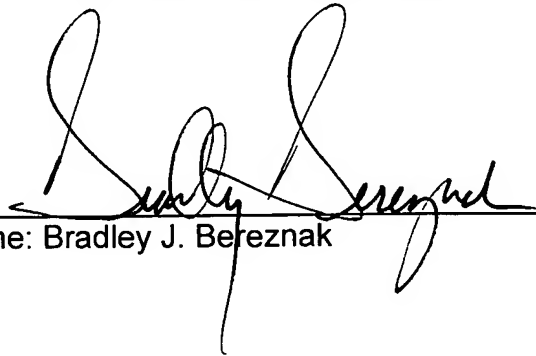
  
Name: Bradley J. Bereznak



Exhibit 1



# OnLive™ Proposal for Echostar

Steve Perlman  
President, Rearden Studios, Inc.

19 November 2002

*Handwritten signature: Steve Perlman*  
12/10/02



# Conventional Wisdom

- CATV Industry

- ↑ Steady cable modem growth
- ↔ VOD slowly rolling out
- ↓ Loss of high-end subs to DBS
- ↓ Lowest customer satisfaction in service industry

- DBS Industry

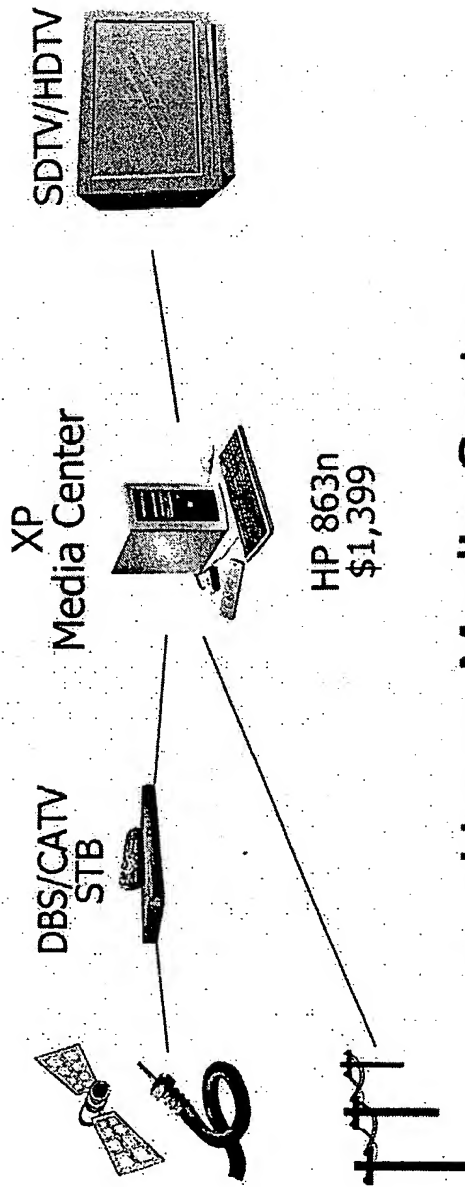
- ↑ Continued subscriber growth
- ↔ Basic DVR slowly rolling out
- ↓ No practical Internet connectivity
- ↓ No practical MDU deployment



## Few Broadband Success Stories

- TiVo is on DirecTV, but on life support
- Moxi will be on Charter, but team is gone
- Microsoft singed its fingers
  - UltimateTV dead, MSTV a failure
  - in litigation w/EchoStar over DishPlayer
- Diva bankrupt
- Pace top management has left
- Moto/SA faring poorly

# Microsoft filling the vacuum



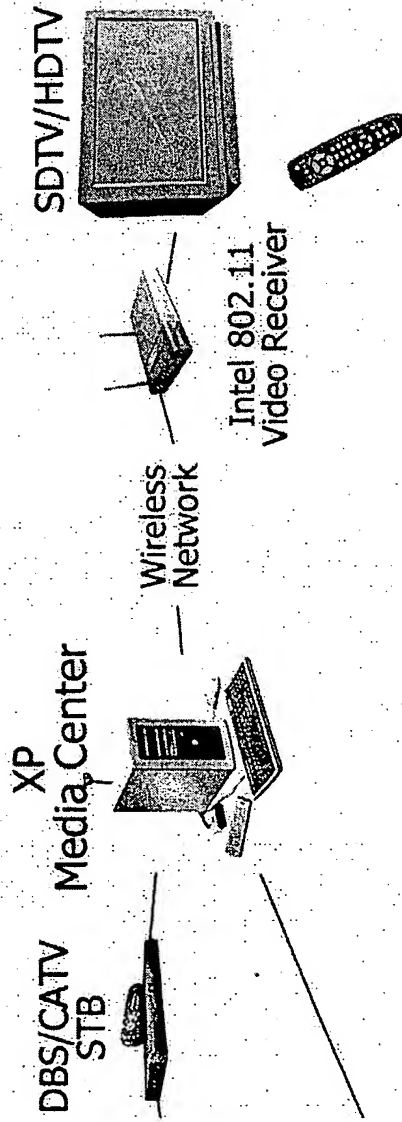
HP 863n  
\$1,399

## • eHome Media Center

- ↑ Complete video, audio, Internet integration
- ↑ Adequate UI
- ↓ First version expensive, poor video quality

# Intel Wireless PC Initiative

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- Intel Wireless PC Initiative
  - Relatively simple installation
  - Solves the PC location problem

# Why eHome is bad for DBS/CATV

- Marginalizes DBS/CATV within a PC-centric world
  - Programming disassociated from operator & network
  - Microsoft-defined user interface
  - Microsoft added-value content
- No security
  - Grabs *analog* video, which is DRM-free
  - Content easily networked to neighbors, uploaded
- Opens door for "Napsterization"
  - Direct competition with pirated content
  - Pay channels easily re-broadcasted over Internet

# Why eHome will happen

- Consumers frustrated with DBS/Cable boxes
  - Have not kept pace with PC innovations
    - "Cable is 10 years behind, DBS is 5 years behind"
  - Difficult to hook up and use
  - Nothing on the horizon
    - No one will fund MSO-dependent startups after Moxi
- Internet content is readily available
  - Legit: Movielink, MusicNet
  - Pirate: Kazaa, Morpheus
- Microsoft won't stop
  - Infinite investment capacity
- Apple readying own "eHome" solution



# What can you do about it?

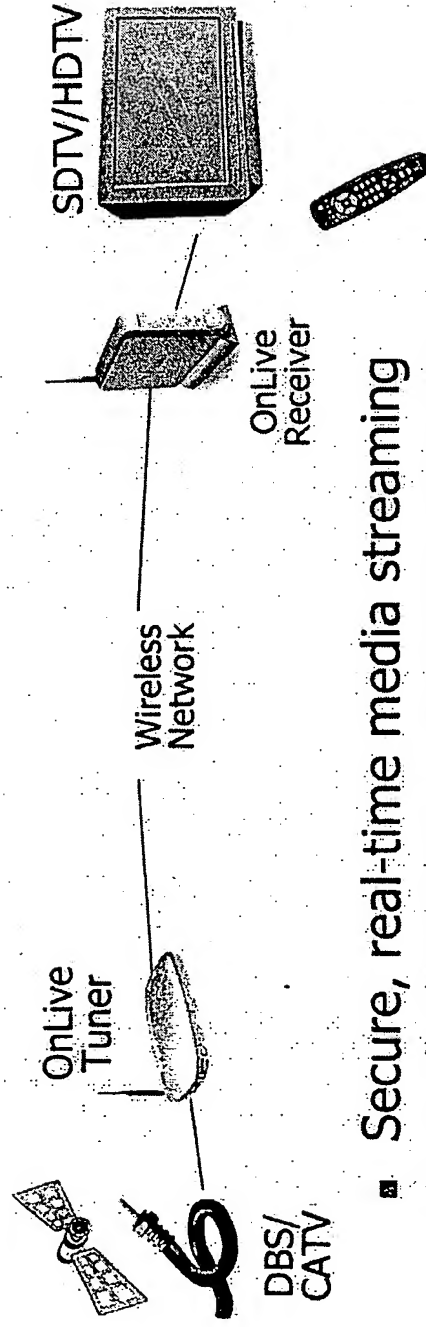
Take control of your content while  
you still can...

...by shifting PC from a hub to a  
peripheral.

# Wireless renaissance

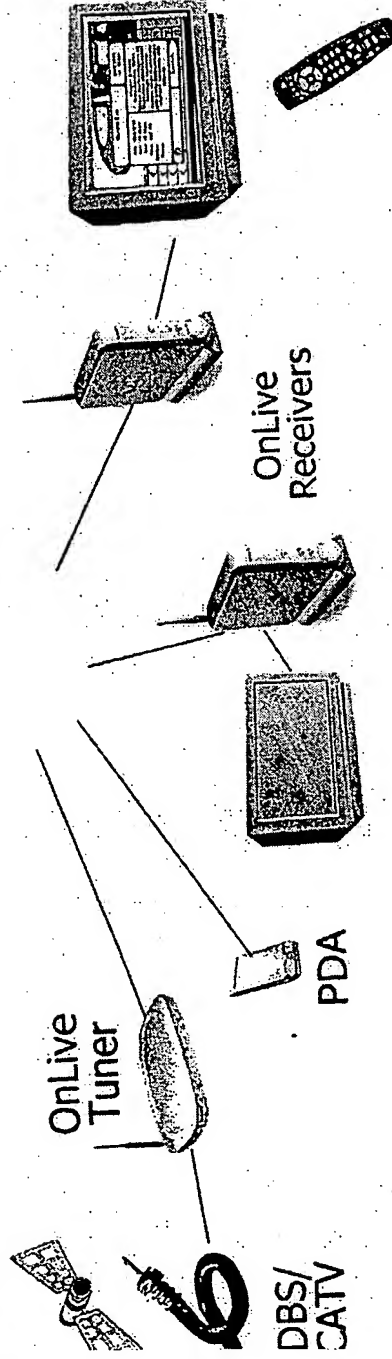
- The new Internet
  - ISM 2.4/5 GHz bands wide-open territory
- Innovation like 90s modem technology
  - 8/02: NetGear ships 108 Mbps 802.11a (5 GHz)
  - 10/02: DLink ships \$99 wireless repeater (2.4 GHz)
  - 11/02: NetGear announces 1Q03 54 Mbps 802.11g (2.4 GHz)
- New antennas
  - Directional, passive repeaters, phased arrays
  - From 300 ft indoors to 3 miles outdoors
- Prices falling like a rock
  - 802.11b (2.4 GHz) standard in new portables
  - Intel, IBM, AT&T all planning major initiatives

# OnLive™ technology



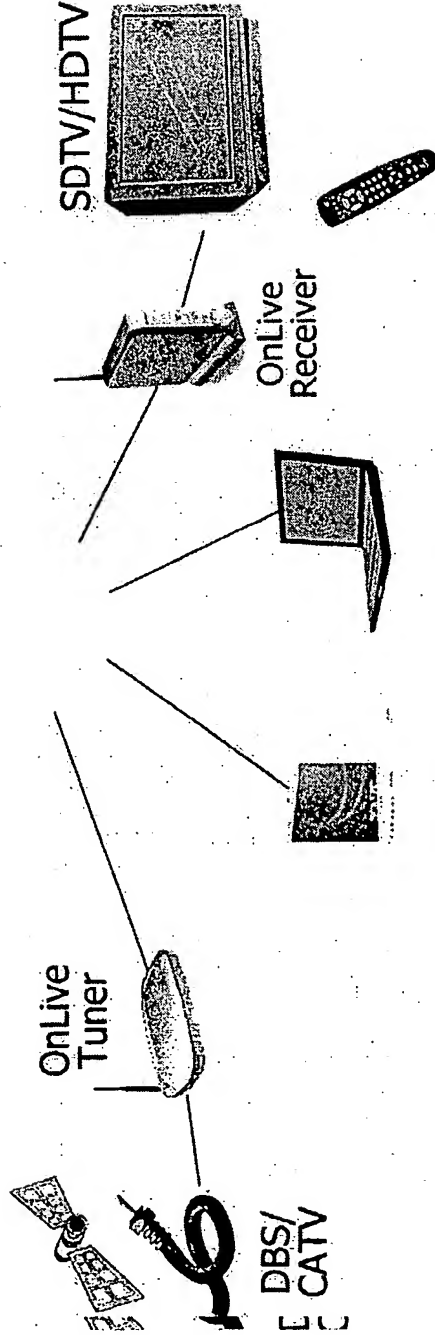
- Secure, real-time media streaming
- Sophisticated entitlement protocols
  - Any device can store, transmit OnLive content
  - Only OnLive-enabled devices can play OnLive content
  - Scope of use based on device/user credentials
  - Can limit simultaneous viewings, number of viewings, etc.
- As convenient as unencrypted content

# Presentation control



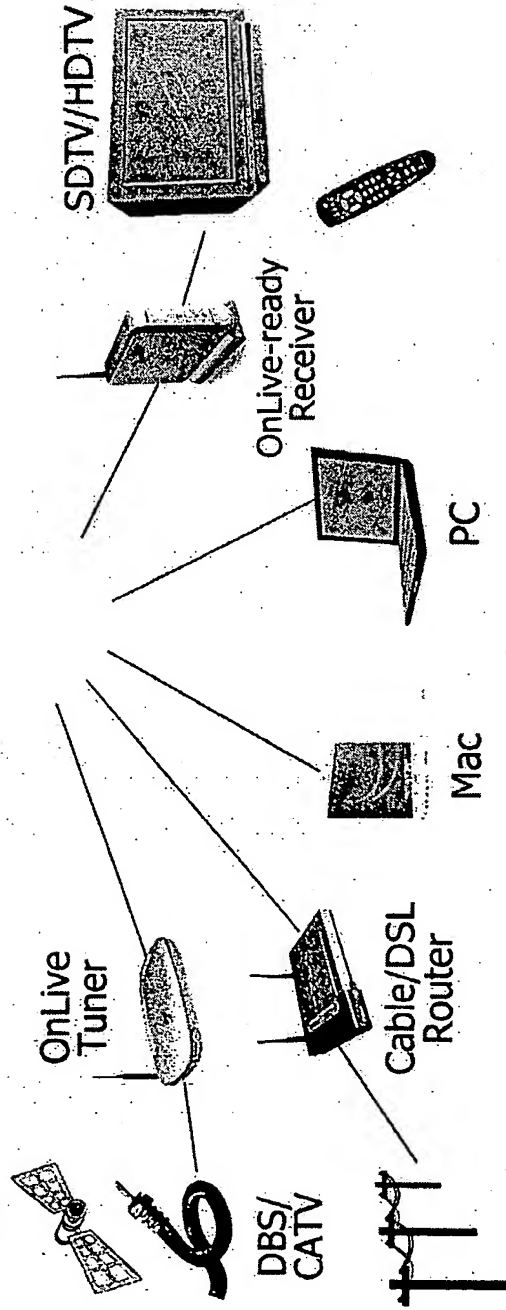
- OnLive content carries presentation layer with it
  - Content appears as operator wants it to appear
  - Java, DVD, or Flash-based applets
- Device independent
  - Multiple TVs, PC/Mac, MP3 player, PDA, digital camera
- "QuickTime" for wireless

# PC/Mac compatibility

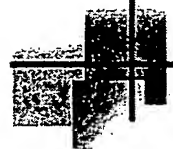


- Any PC/Mac can securely play OnLive content
  - Auto-detect/auto-driver download/auto-logon
  - PC/Mac will observe entitlements (like MovieLink)
  - PC/Mac will use attached content presentation
- Serendipitous viewing supported
  - Any users in range of network can utilize OnLive services

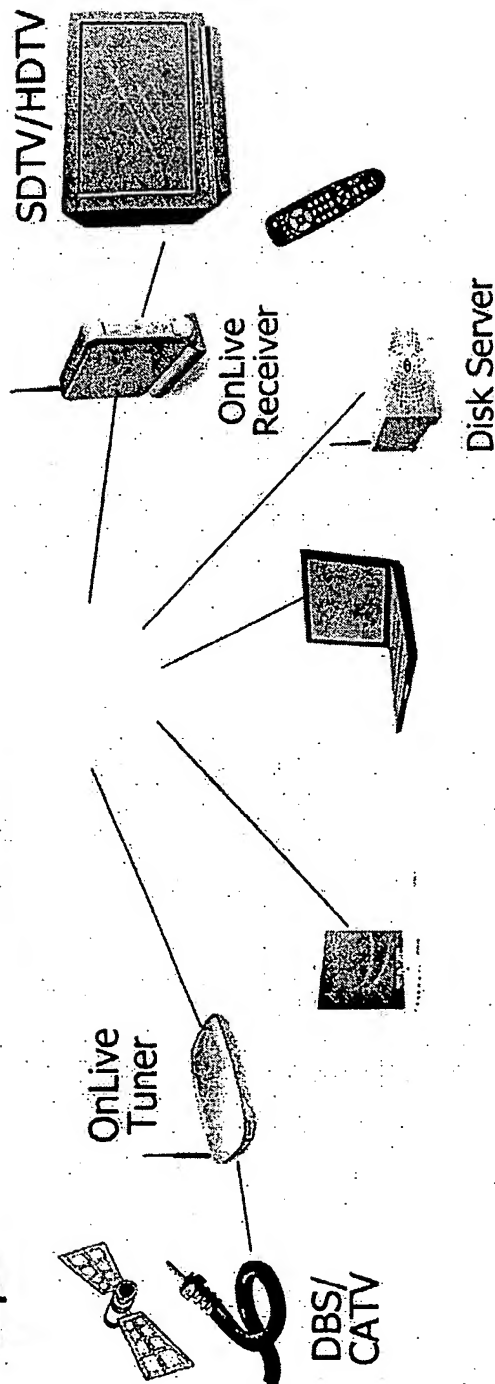
# Internet integration



- Seamlessly co-exists with Internet traffic
  - Does not compromise OnLive security
  - Still retains user-, and device-level controls
  - OnLive auto-discovers Internet connection, utilizes it

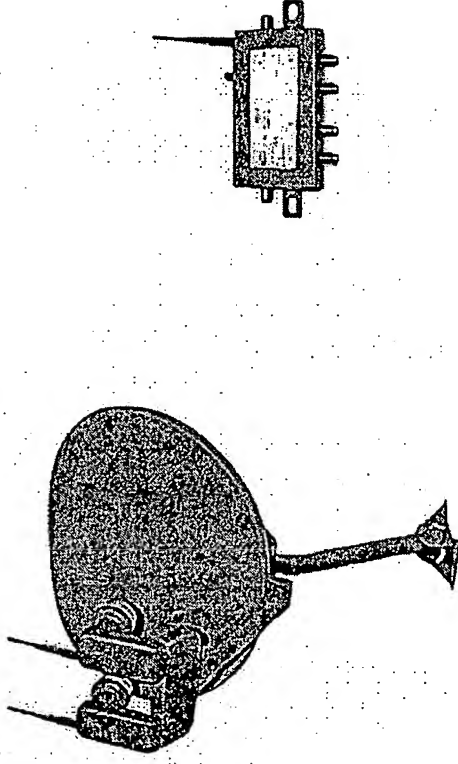


# Disk integration



- PVR utilizes any disk on network
  - Any connected Mac/PC's disk
  - Wireless Disk Server (2-disk redundant array)
  - Off-site disks (within *Betamax* constraints)
- Portables can take content with them
  - Subject to entitlements

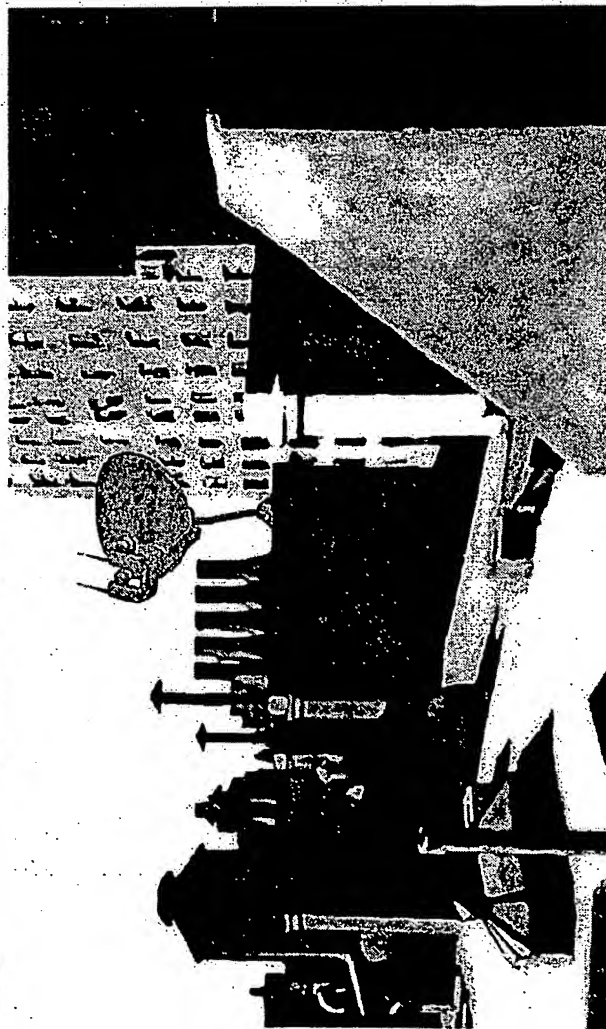
# OnLive outdoors



- Higher transmit power permitted outdoors
- Can be built into LNBs
  - Utilizes LNB power
  - Easy upgrade to existing dishes
- Can be built into distribution boxes
  - Or splice into coax anywhere

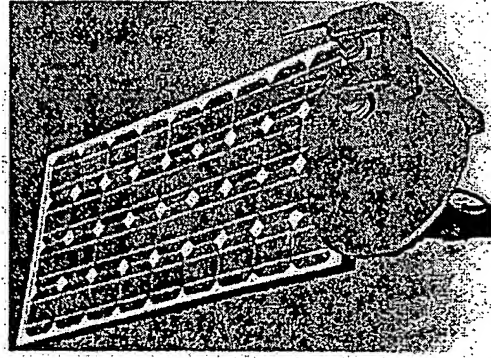


# OnLive on rooftops

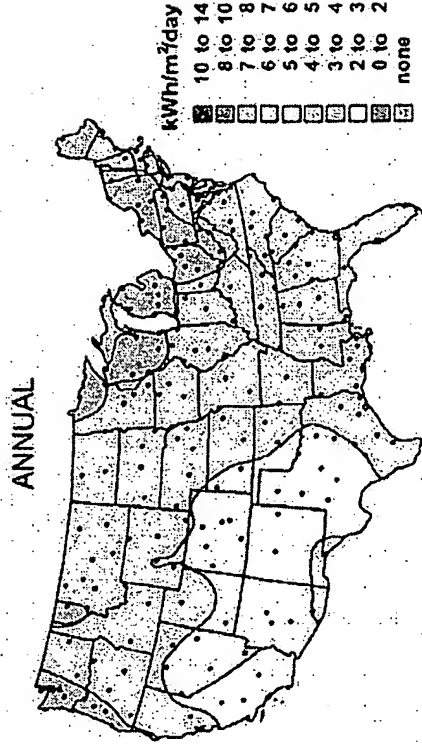


- Serve entire MDUs wirelessly
- Directional antennas can be used if necessary
- Can offer VOD services through Disk Servers
- Can package DSL connectivity with video

# OnLive Free-standing



1960-1990  
Minimum Daily Solar Radiation Per Month



- 25-100W panel supports 802.11 repeater 24x7
  - Based on 30 years of solar radiation data
- Would require low-power LNB for Sat reception
  - One dish can serve a large area
- Network nodes self-diagnosing

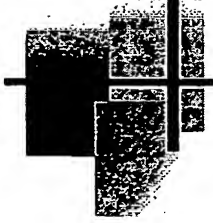
## Why not an open standard?

- User experience *critical* for success
  - 802.11 standards not user-friendly or CE-ready
  - Real-time, installation, maintenance considerations
- Subject to industry-wide consensus
  - PC, CE, Content industries have own agendas
  - Slow, political process
    - Not amenable to artistic/user experience issues
    - Microsoft/Intel can deliberately slow it down
- Better than nothing
  - I'll probably pursue it if can't motivate DBS or Cable
  - Patents give me some "do the right thing" leverage

## What it will take

- Commitments
  - EchoStar or Comcast needs to endorse
    - DirecTV if News picks them up
  - 1 major CE (Thomson already on board)
  - Primary funding needed from partners
  - Deployment commitment needed
    - Needs to support a reasonable business model
- Team
  - 20-50 people, depending on scope of work
  - Top talent available cheap

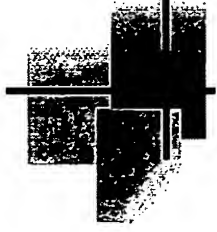
**Exhibit 2**



**OnLive™**

Steve Perlman  
President, Rearden Studios, Inc.

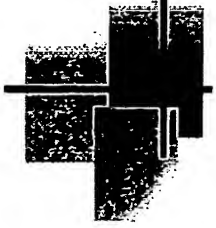
12 December 2002



# Conventional Wisdom

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- CE Industry
  - ↑ Growth in wide-screen sets, DVD players
  - ↕ Digital cameras eclipsing film
  - ↓ PC absorbing more CE applications
  - ↓ Weak or negative margins
  - ↓ ATSC doesn't work in practice
  - ↓ Locked out of digital CATV, Echostar
  - ↓ Locked out of video games

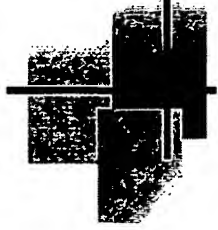


# Conventional Wisdom

---

- CATV Industry
  - ↑ Steady cable modem growth
  - ↔ VOD slowly rolling out
  - ↓ Loss of high-end subs to DBS
  - ↓ Lowest customer satisfaction in service industry
- DBS Industry
  - ↑ Continued subscriber growth
  - ↔ Basic DVR slowly rolling out
  - ↓ No practical Internet connectivity
  - ↓ No practical MDU deployment





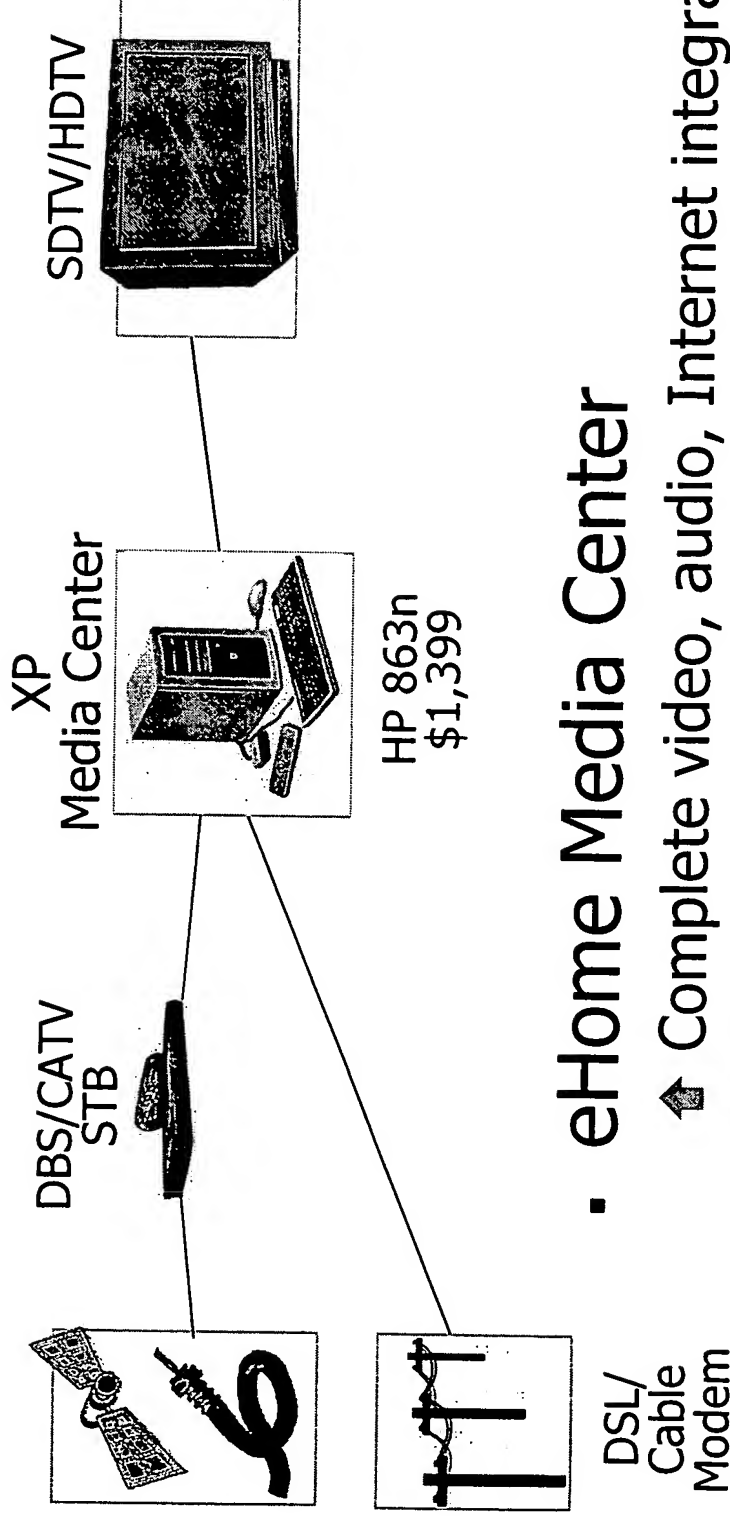
# Few Broadband Success Stories

---

- TiVo is on DirecTV, but on life support
- Moxi will be on Charter, but team is gone
- Microsoft singed its fingers
  - UltimateTV dead, MSTV a failure
  - in litigation w/EchoStar over DishPlayer
- Diva bankrupt
- Pace top management has left
- Moto/SA faring poorly

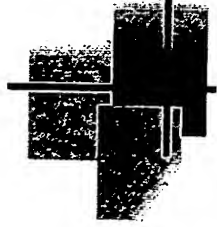


# Microsoft filling the vacuum

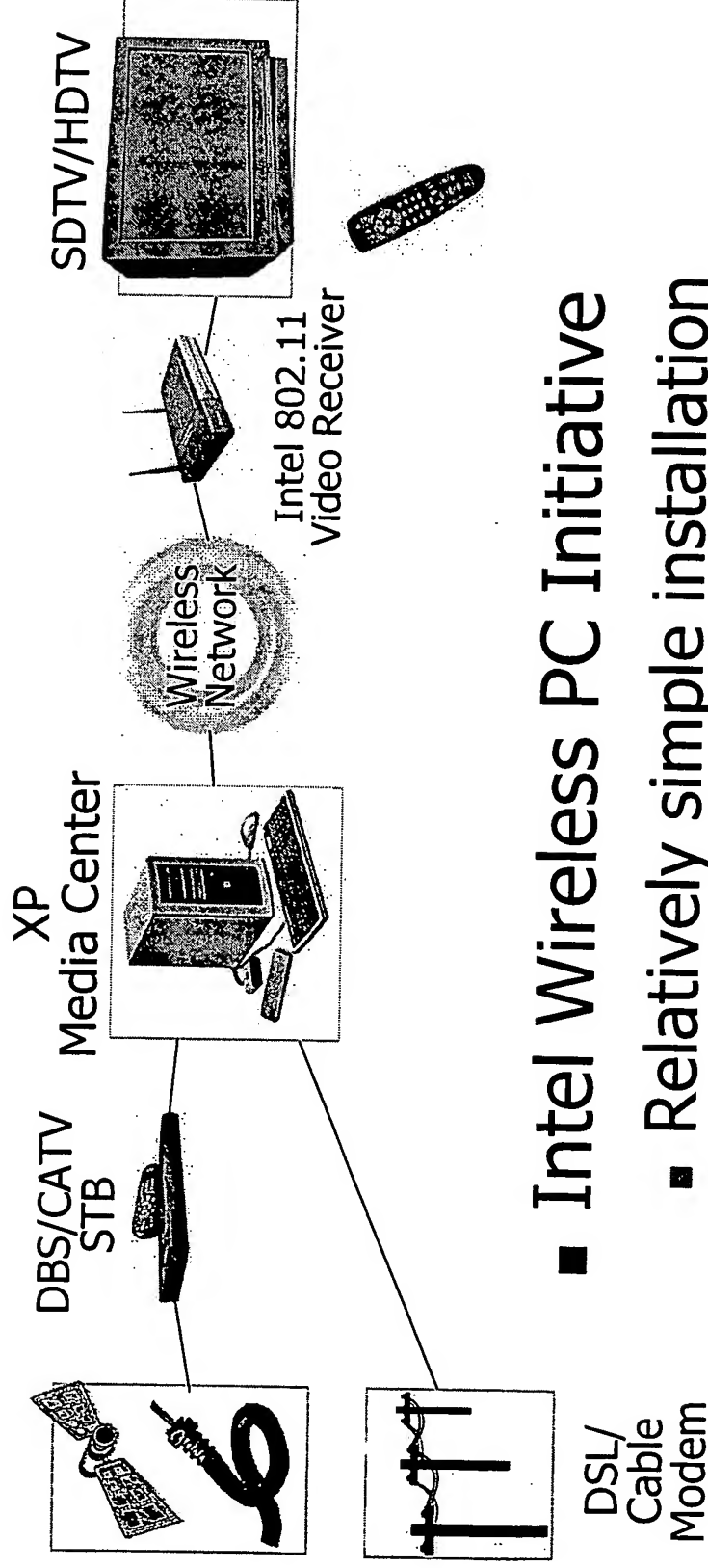


- eHome Media Center

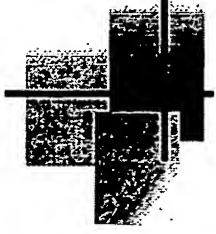
- ↑ Complete video, audio, Internet integration
- ↑ Adequate UI
- ↓ First version expensive, poor video quality



# Intel Wireless PC Initiative



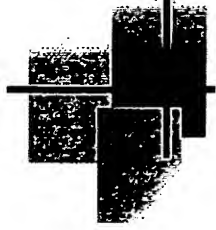
- Intel Wireless PC Initiative
  - Relatively simple installation
  - Solves the PC location problem



# Why eHome is bad for CE

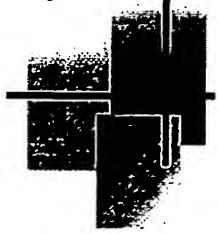
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- Cuts CE devices out of the picture
- No margin for anyone but Microsoft



# Why eHome is bad for DBS/CATV

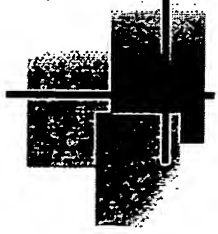
- Marginalizes DBS/CATV within a PC-centric world
  - Programming disassociated from operator & network
  - Microsoft-defined user interface
  - Microsoft added-value content
- No security
  - Grabs *analog* video, which is DRM-free
  - Content easily networked to neighbors, uploaded
- Opens door for “Napsterization”
  - Direct competition with pirated content
  - Pay channels easily re-broadcasted over Internet



# Why eHome will happen

---

- Consumers frustrated with DBS/Cable boxes
  - Have not kept pace with PC innovations
    - "Cable is 10 years behind, DBS is 5 years behind"
  - Difficult to hook up and use
  - Nothing on the horizon
    - No one will fund MSO-dependent startups after Moxi
- Internet content is readily available
  - Legit: Movielink, MusicNet
  - Pirate: Kazaa, Morpheus
- Microsoft won't stop
  - Infinite investment capacity
- Apple readying own "eHome" solution

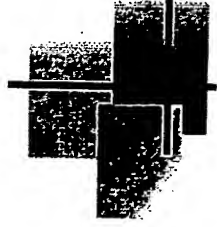


# What can you do about it?

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Establish an advanced CE interconnect standard while you still can...

...and shift the PC from a hub to a peripheral.



# Wireless renaissance

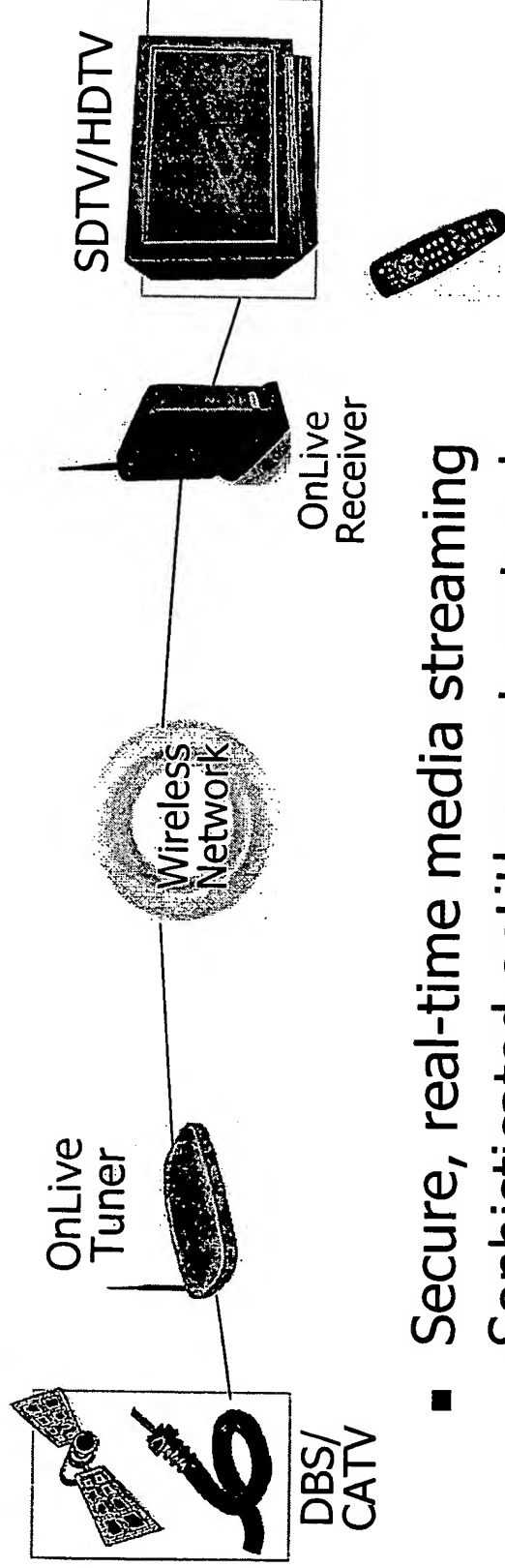
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- The new Internet
  - ISM 2.4/5.8 GHz bands wide-open territory
- Innovation like 90s modem technology
  - 8/02: NetGear ships 108 Mbps 802.11a (5.8 GHz)
  - 10/02: DLink ships \$99 wireless repeater (2.4 GHz)
  - 11/02: NetGear announces 1Q03 54 Mbps 802.11g (2.4 GHz)
- New antennas
  - Directional, passive repeaters, phased arrays
  - From 300 ft indoors to 3 miles outdoors
- Prices falling like a rock
  - 802.11b (2.4 GHz) standard in new portables
  - Intel, IBM, AT&T supporting nationwide coverage

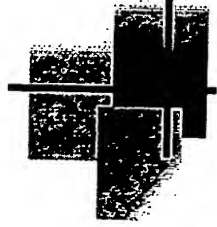




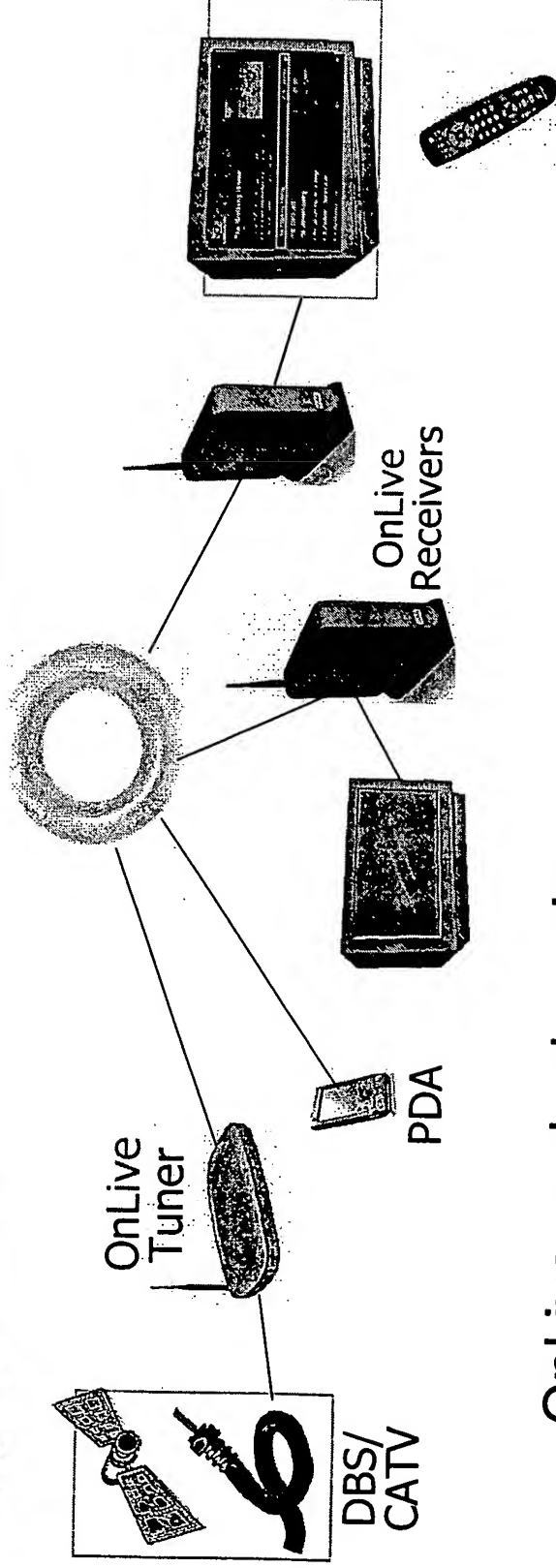
# OnLive™ technology



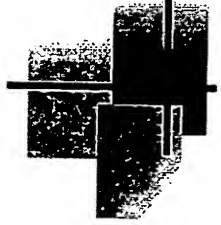
- Secure, real-time media streaming
- Sophisticated entitlement protocols
  - Any device can store, transmit OnLive content
  - Only OnLive-enabled devices can play OnLive content
  - Scope of use based on device/user credentials
  - Can limit simultaneous viewings, number of viewings, etc.
- Self-configuring microcellular network



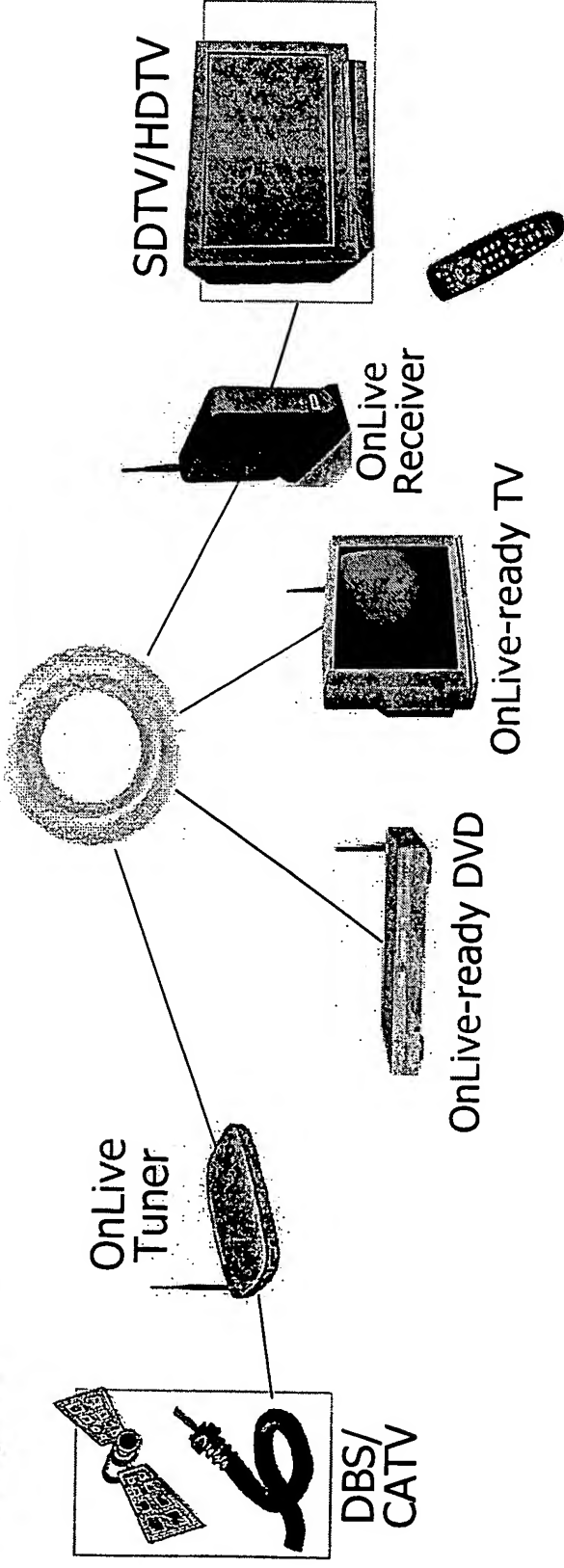
# Presentation control



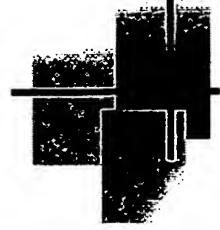
- OnLive content carries presentation layer with it
  - Operator and/or CE-branded
  - Java, DVD, or Flash-based applets
- Device independent
  - Multiple TVs, PC/Mac, MP3 player, PDA, digital camera
- "QuickTime" for wireless



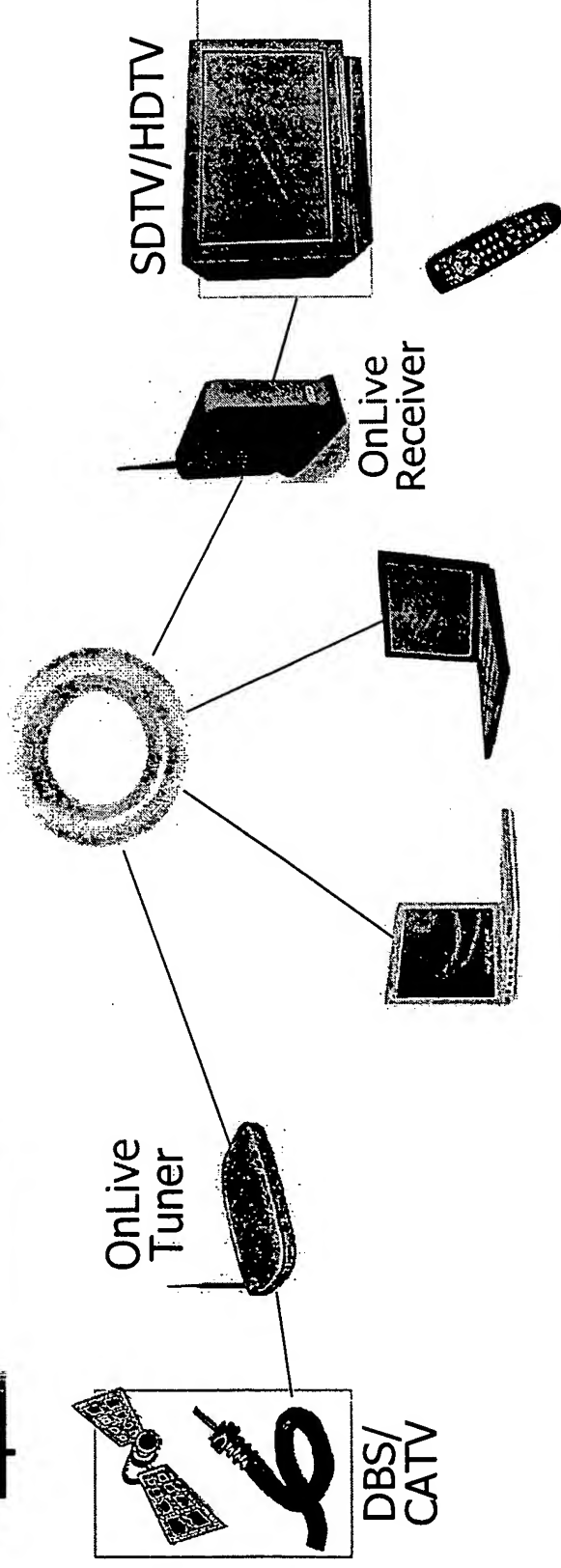
# CE Device compatibility



- Easy to equip CE devices with OnLive
  - Built-in, PC-card, or Firewire dongle
  - Eliminates cables
  - Auto-configures
- Allows devices to have personality, added value
  - Finally, something better than Video 1, Video 2, etc.



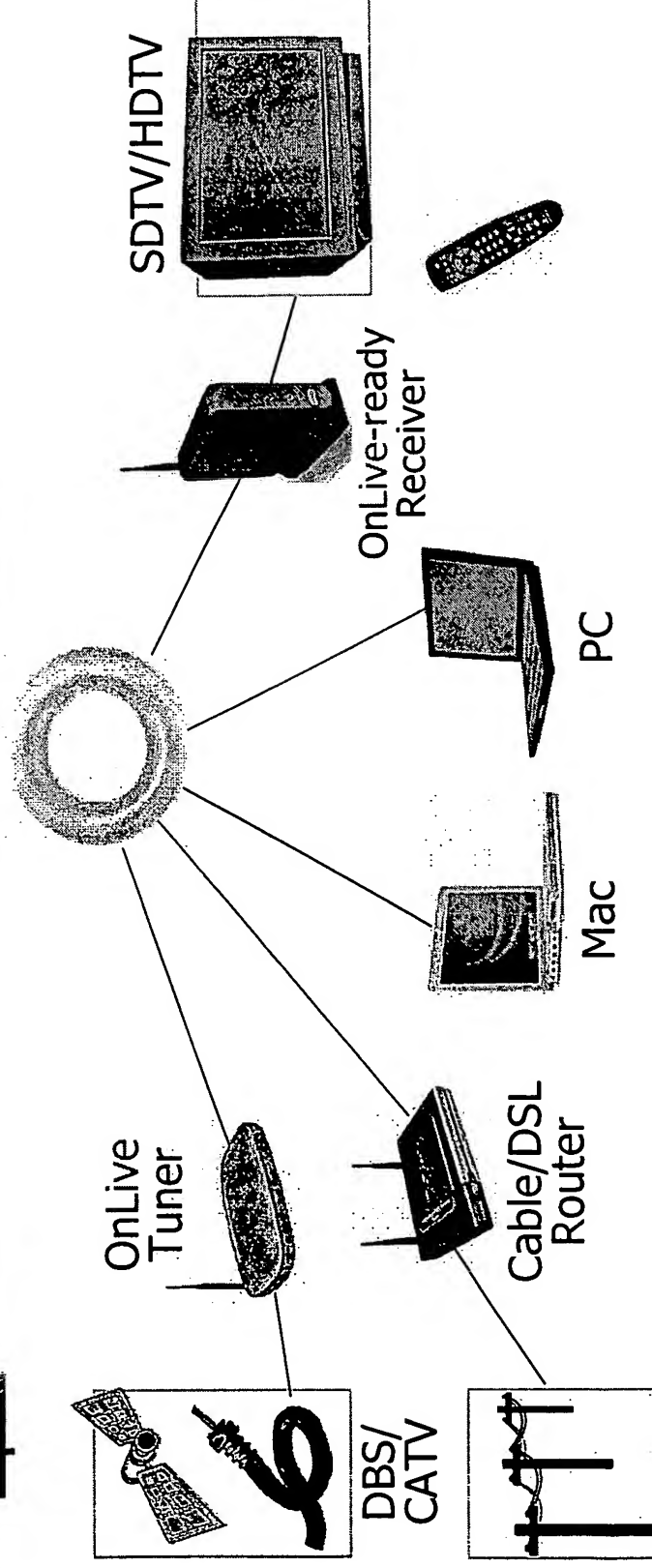
# PC/Mac compatibility



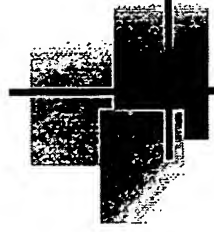
- *Any* PC/Mac can securely play OnLive content
  - Auto-detect/auto-driver download/auto-logon
  - PC/Mac will observe entitlements (like MovieLink)
  - PC/Mac will use attached content presentation
- Serendipitous viewing supported
  - Any users in range of network can utilize OnLive services



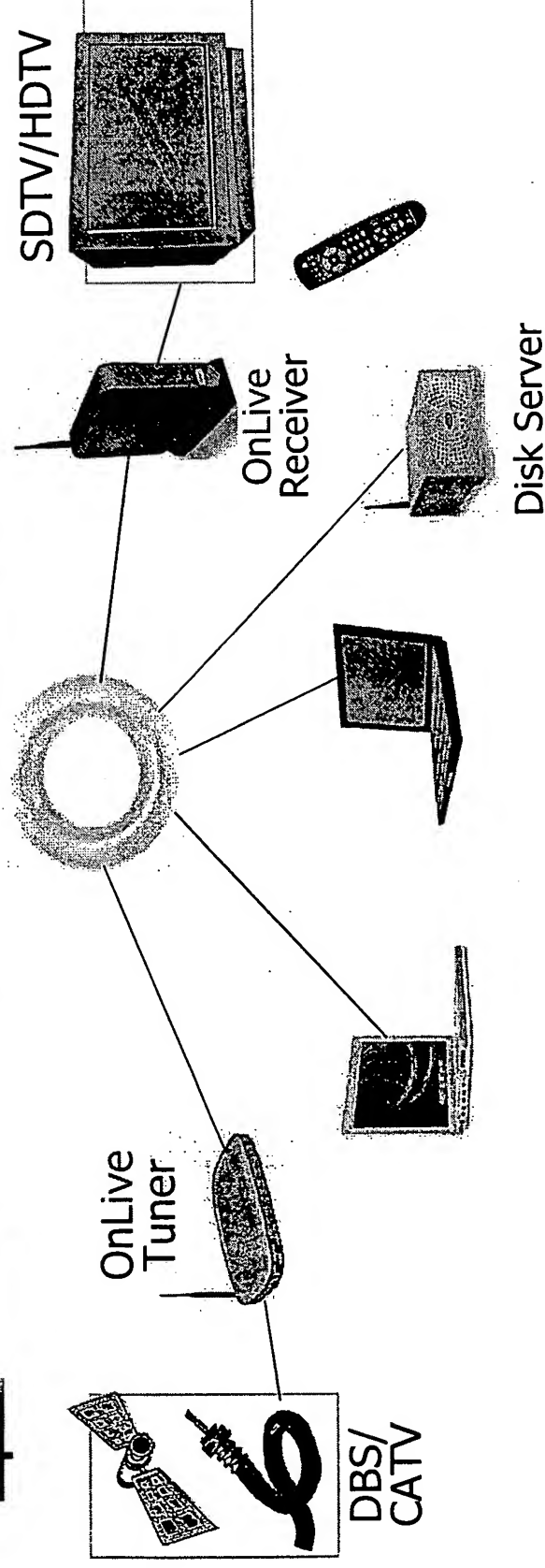
# Internet integration



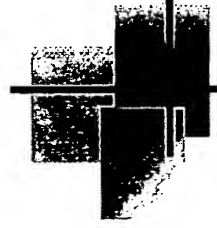
- Seamlessly co-exists with Internet traffic
  - Does not compromise OnLive security
  - Still retains user-, and device-level controls
  - OnLive auto-discovers Internet connection, utilizes it



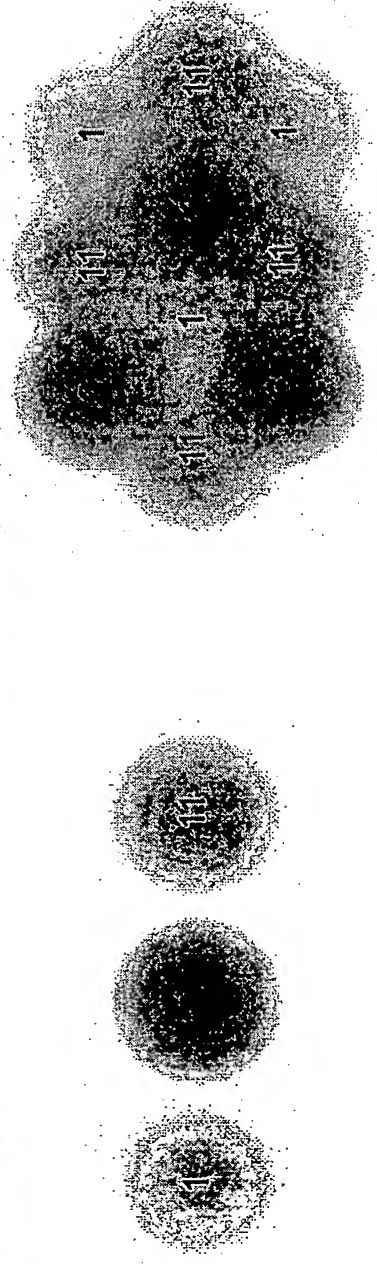
# Disk integration



- PVR utilizes any disk on network
  - Any connected Mac/PC's disk
  - Wireless Disk Server (2-disk redundant array)
  - Off-site disks (within *Betamax* constraints)
- Portables can take content with them
  - Subject to entitlements



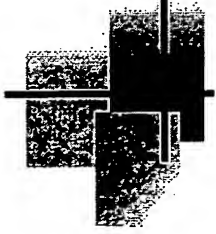
# Wireless coverage



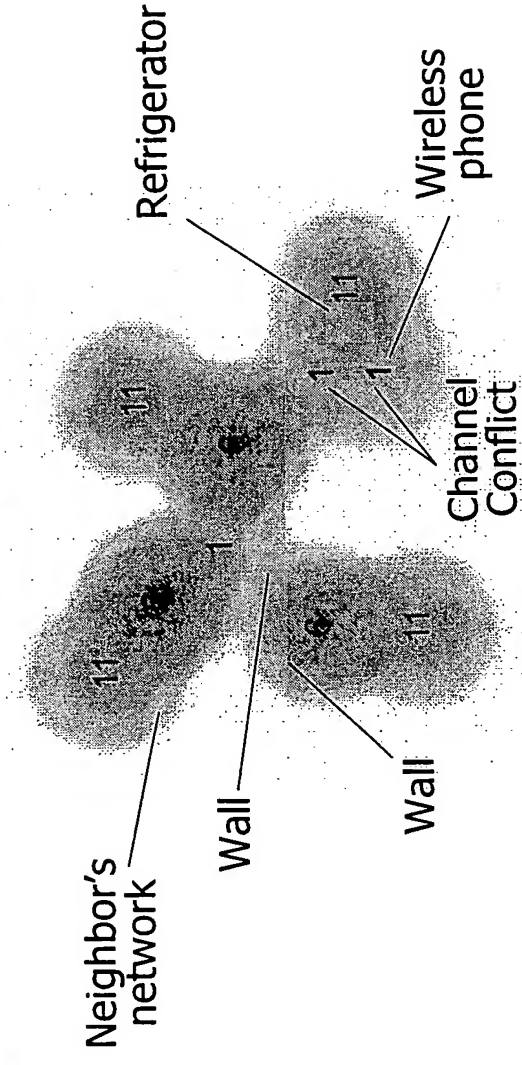
2.4 GHz  
non-overlapping channels

Idealized cellular  
topology

- Repeaters needed for media bandwidths
  - Single access point unlikely to serve entire home
  - No one will run Cat 6 between APs
- Repeaters require non-overlapping channels
  - 2.4 GHz has 3 channels, 5.8 GHz has 8 channels
- Cellular topology can provide full-home coverage...
  - ...in an ideal world

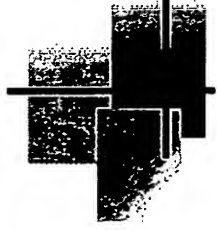


# Real world issues

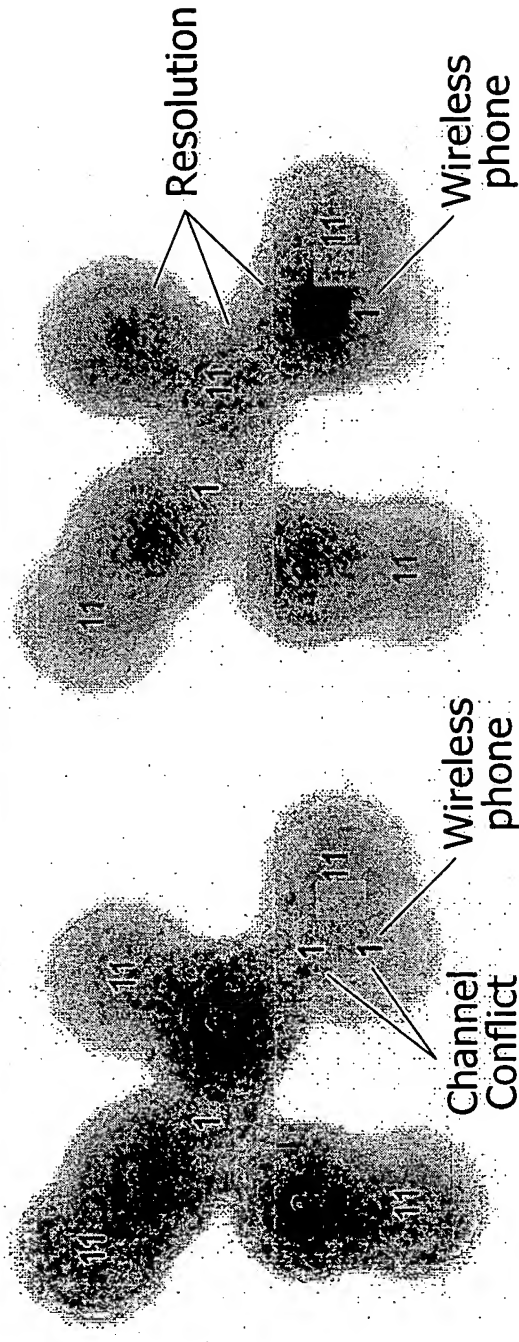


- RF obstacle courses
  - Walls, large appliances, concrete
  - Multiple stories
  - Suboptimal repeater placement
- External interference
  - Wireless phones, x10 cameras
  - Neighbor's networks

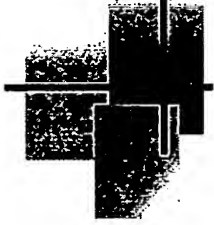




# OnLive adapts to real world

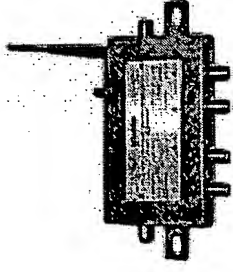
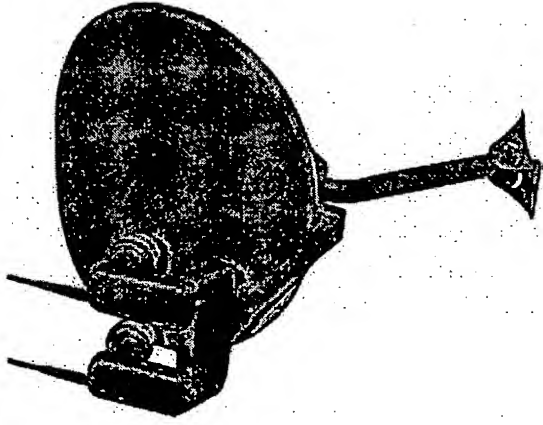


- OnLive creates, maintains optimal topology
  - Self-configures no matter where repeaters plugged in
  - Conforms around non-OnLive devices
  - Adapts as the environment changes
- Creates a media-live household
  - Opens the door to a world of products and services

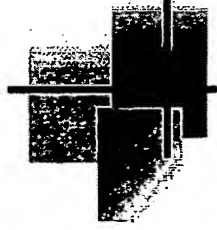


# OnLive outdoors

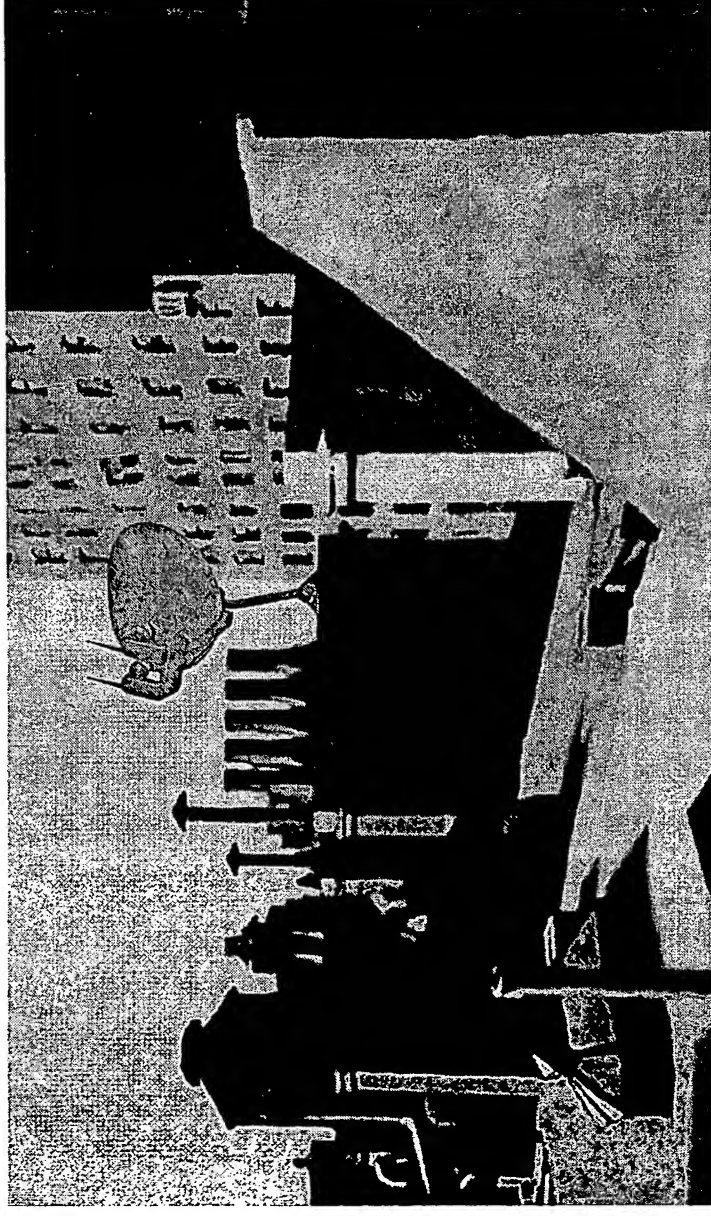
---



- Higher transmit power permitted outdoors
- Can be built into LNBs
  - Utilizes LNB power
  - Easy upgrade to existing dishes
- Can be built into distribution boxes
  - Or splice into coax anywhere



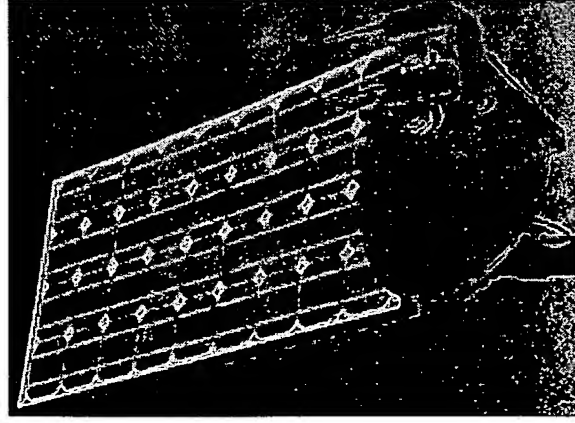
# OnLive on rooftops



- Serve entire MDUs wirelessly
- Directional antennas can be used if necessary
- Can offer VOD services through Disk Servers
- Can package DSL connectivity with video



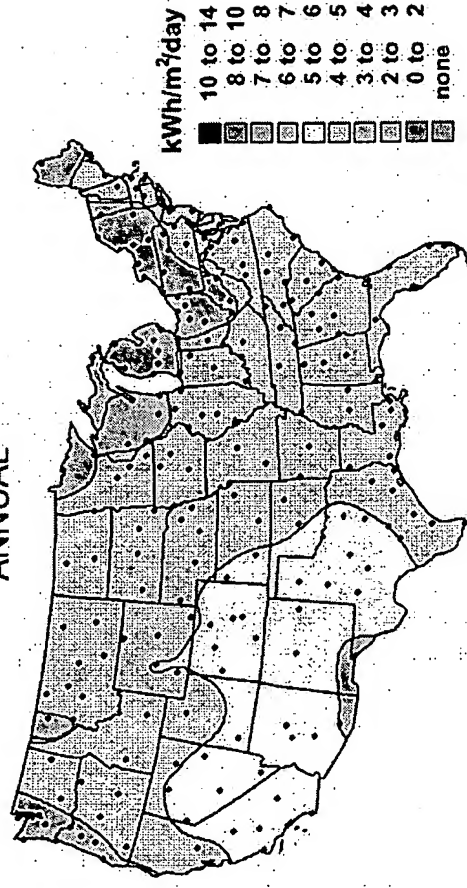
# OnLive Free-standing



1960-1990

Minimum Daily Solar Radiation Per Month

ANNUAL



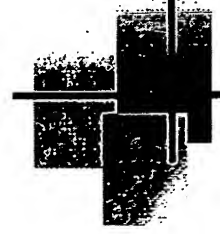
- 25-100W panel supports 802.11 repeater 24x7
  - Based on 30 years of solar radiation data
- Would require low-power LNB for Sat reception
  - One dish can serve a large area
- Network nodes self-diagnosing



# Why not an open standard?

---

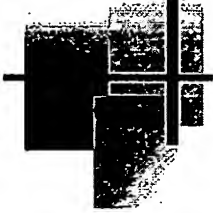
- User experience *critical* for success
  - 802.11 standards not user-friendly or CE-ready
  - Real-time, installation, maintenance considerations
- Subject to industry-wide consensus
  - PC, CE, Content industries have own agendas
  - Slow, political process
    - Not amenable to artistic/user experience issues
    - Microsoft/Intel can deliberately slow it down
- Better than nothing
  - I'll probably pursue it if can't motivate DBS or Cable
  - Patents give me some "do the right thing" leverage



# What OnLive will take

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- Commitments
  - EchoStar or Comcast needs to endorse
    - DirecTV if News picks them up
  - 2 major CEs
  - Primary funding needed from partners
  - Deployment commitment needed
    - Needs to support a reasonable business model
- Team
  - 20-50 people, depending on scope of work
  - Top talent available cheap



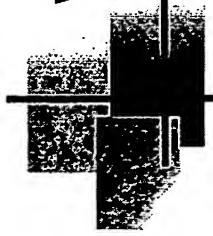
# **Appendix:**

# **OnLive<sup>™</sup>**

# **Game Platform**

Steve Perlman  
President, Rearden Studios, Inc.

12 December 2002

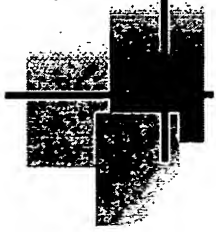


# Why PC platforms matter

---

- Standard API
- Standard UI
- Rich set of tools
- Developer support services
- User support services
- Marketing dollars
- Specialized hardware

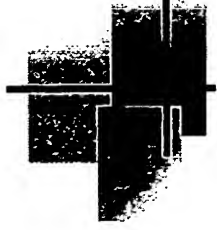




# Why game platforms don't

---

- Cross-platform game engines
- Game-specific UI
- Proprietary tools
- Primary developer issues are internal
- Direct customer service relationship
- SW brand as strong as platform brand
- Specialized hardware available from 3<sup>rd</sup> parties

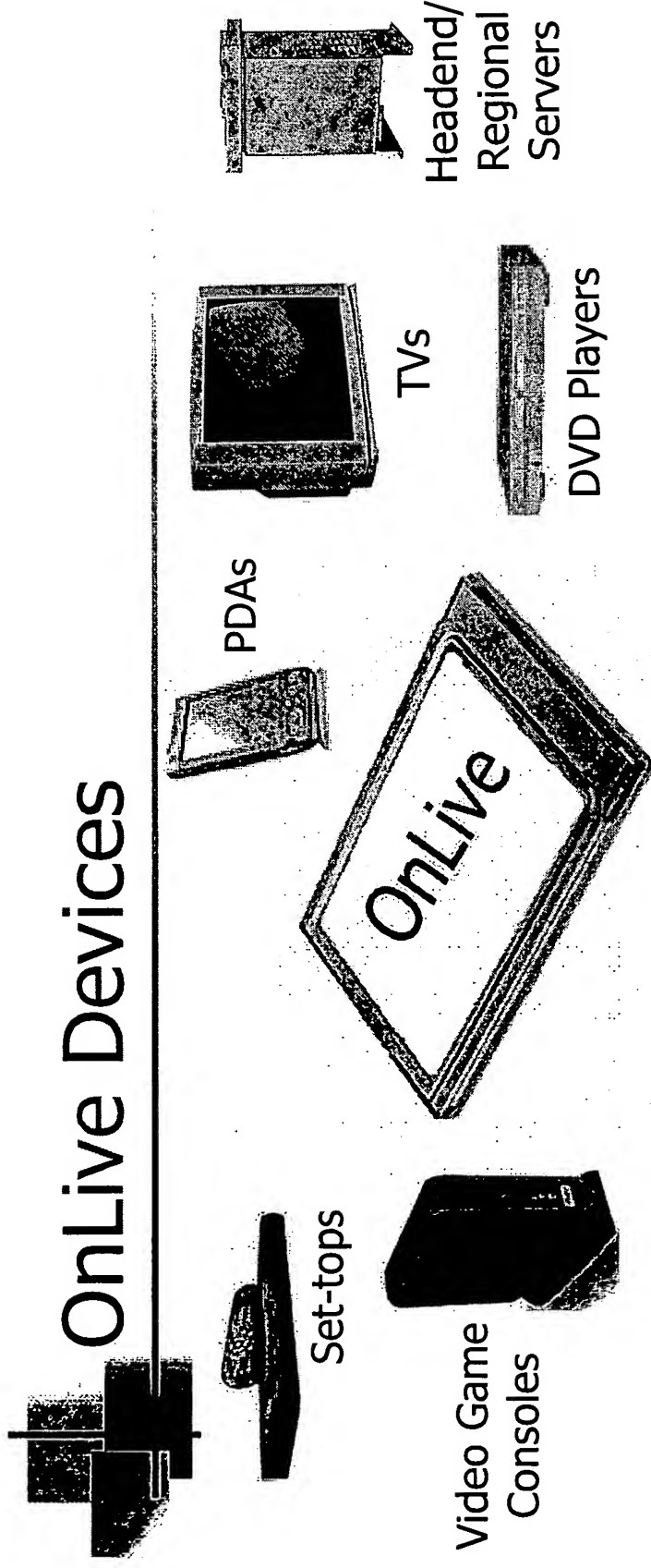


# The OnLive Game Platform

---



- Specialized game hardware on a Cardbus card
  - Graphics/sound engine, SDRAM, CPU, and security
- Plugs into a range of CE devices
  - Utilizes RAM, IR receiver, mass storage/network connection
- Controlled by game developer industry
  - Secure
  - Untaxed



- Extends video game platform reach
  - Makes video games a type of media, rather than an application
  - Converging into the motion picture business
- Better economics
  - Eliminates redundant electronics
- Defies obsolescence
  - Just slip in new card



# What OnLive gaming will take

- Commitments
  - EA and 2 or 3 other major developers
  - 2 major CEs
  - Primary funding needed from partners
  - Deployment commitment needed
    - Needs to support a reasonable business model
- Team
  - 20-30 people, depending on scope of work
  - Top talent available cheap

**Exhibit 3**

**BURGESS**

**&**

**BEREZNAK**

A LIMITED LIABILITY PARTNERSHIP

800 EL CAMINO REAL, SUITE 180

MOUNTAIN VIEW, CALIFORNIA 94040

(650) 903-2264 (Phone); (650) 903-2280 (Fax)

**FACSIMILE TRANSMITTAL SHEET**

Deliver to: Peter Natscher  
Firm Name: TECHNICAL GRAPHICS  
Fax Number: (877) 654-6801 Telephone No.: (877) 654-6811  
From: Brad Berezna  
Date: December 30, 2002 Time: 1:00 p.m.  
Operator: bjb Matter: 08258.P007  
Your Reference: \_\_\_\_\_  
Number of pages including cover sheet: 19

Hi Peter,

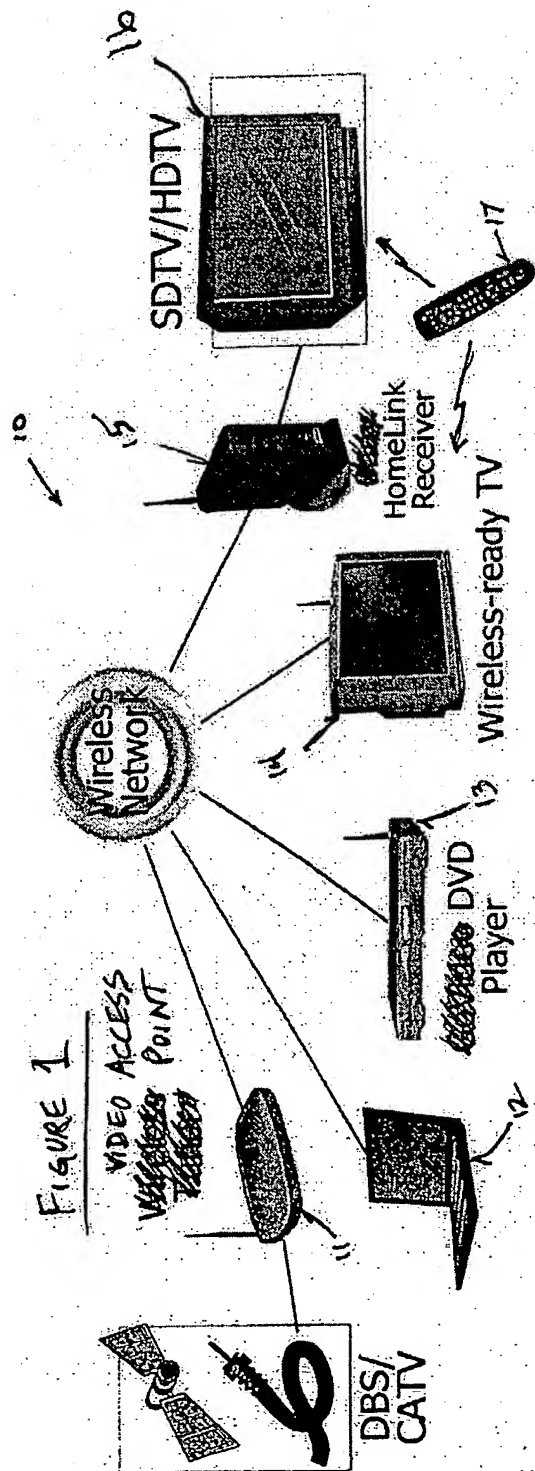
Attached is a set of Figures for the above case. As usual, please send the formal drawings electronically in .pdf format. Let me know if you have any questions. Thanks, and I wish you a happy and prosperous 2003.

Brad

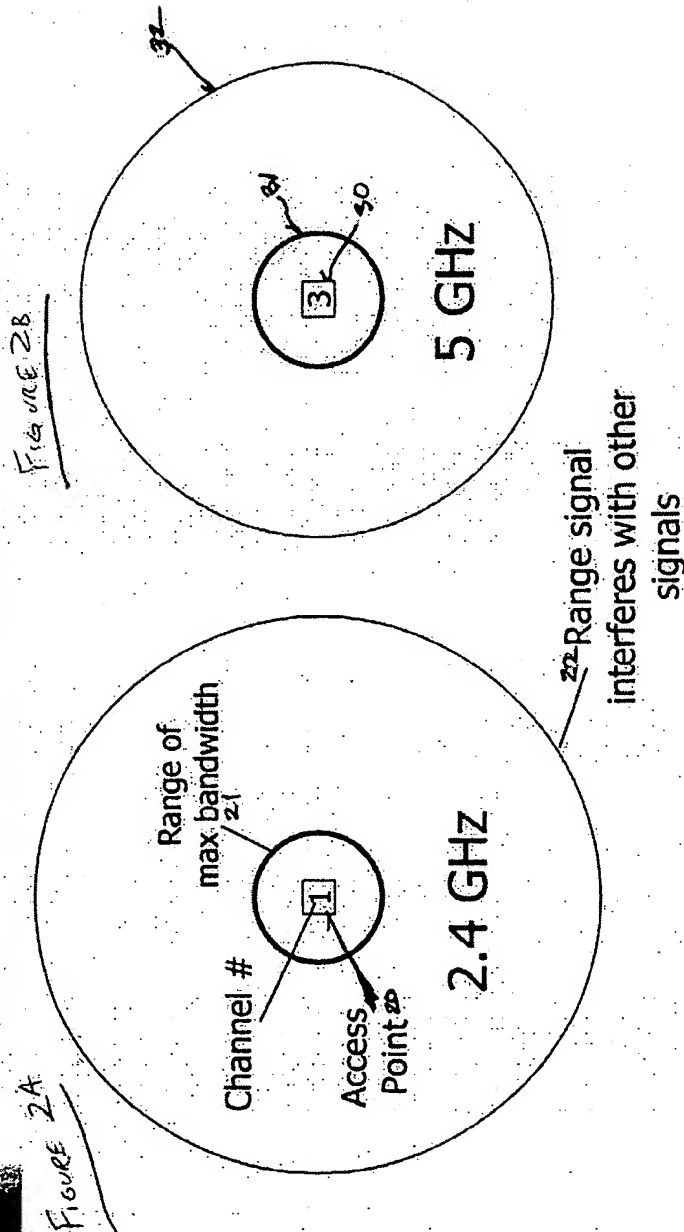
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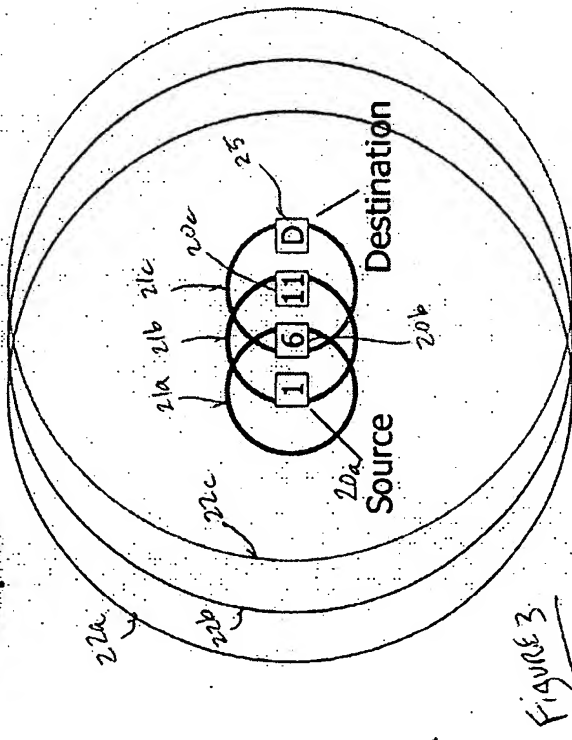
# 2.4 & 5 GHz signal range



- 2.4 & 5 GHz have similar max bandwidth range
- 5 GHz has shorter potential signal interference range



# OnLive wireless repeating



Time

|            |                 |                   |                   |                   |
|------------|-----------------|-------------------|-------------------|-------------------|
| 2.4G ch 1  | Source Packet 1 | Source Packet 2   | Source Packet 3   | Source Packet 4   |
| 2.4G ch 6  |                 | Repeated Packet 1 | Repeated Packet 2 | Repeated Packet 3 |
| 2.4G ch 11 |                 |                   | Repeated Packet 1 | Repeated Packet 2 |

Not BW loss

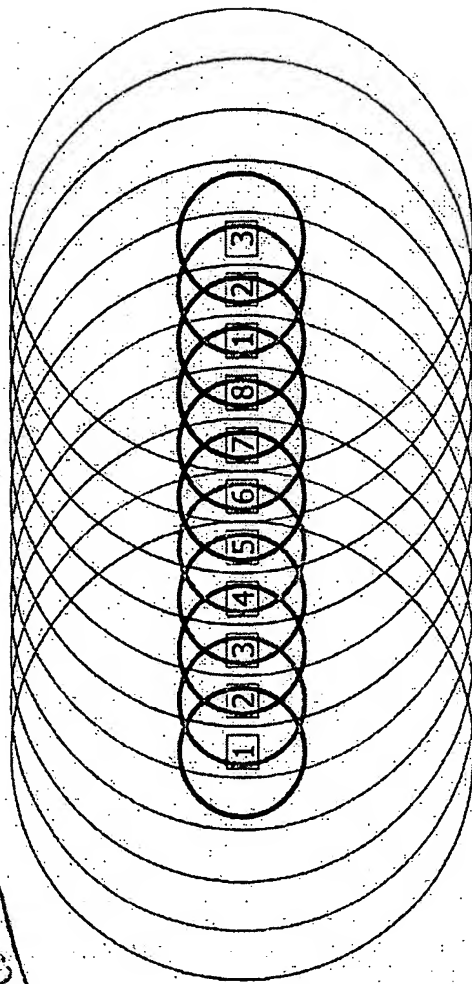
Figure 4

- Each hop uses a different channel
  - Repeated packets overlap in time
  - Packets are pipelined across channels
- No loss of bandwidth

# 5 GHz range limits

10 hops : 500' at full bandwidth

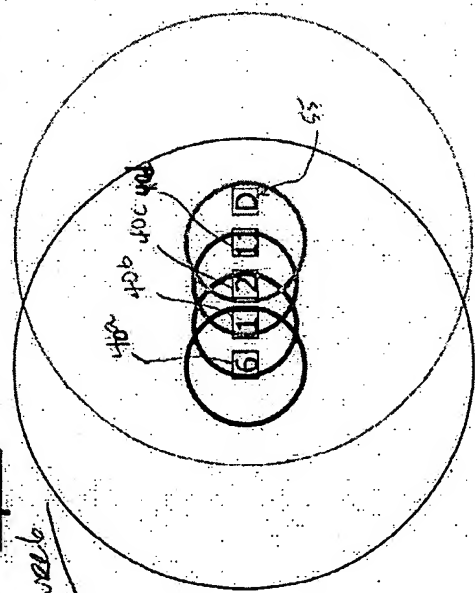
Figure 5



- With 12 channels, hops can extend indefinitely
  - Repeaters extend far enough for channel reuse
    - Especially true given low power needed for short hops
  - Works in all 3 dimensions
- Range unlimited from source to destination

# 2.4 GHz on 5 GHz backbone

Figure 7



| Time       |                    |                    |                    |                    |
|------------|--------------------|--------------------|--------------------|--------------------|
| 2.4G ch 6  | Source Packet 1    | Source Packet 2    | Source Packet 3    | Source Packet 4    |
| 5G ch 1    | Repeating Packet 1 | Repeating Packet 2 | Repeating Packet 3 | Repeating Packet 4 |
| 5G ch 2    | Repeating Packet 1 | Repeating Packet 2 | Repeating Packet 3 | Repeating Packet 4 |
| 2.4G ch 11 | Repeating Packet 1 | Repeating Packet 2 | Repeating Packet 3 | Repeating Packet 4 |

2.4G to 5G, 5G to 2.4G, or 2.4G to 2.4G on different channels

- 5 GHz OnLive repeaters form arbitrary length backbone for 2.4 GHz traffic
- No constraints if 5 GHz device is either source or dest
  - Usual situation if high BW source is an OnLive video tuner
- If both source and dest are 2.4G, source/dest must be different channels

# 2.4 GHz on 5 GHz backbone

Figure 8

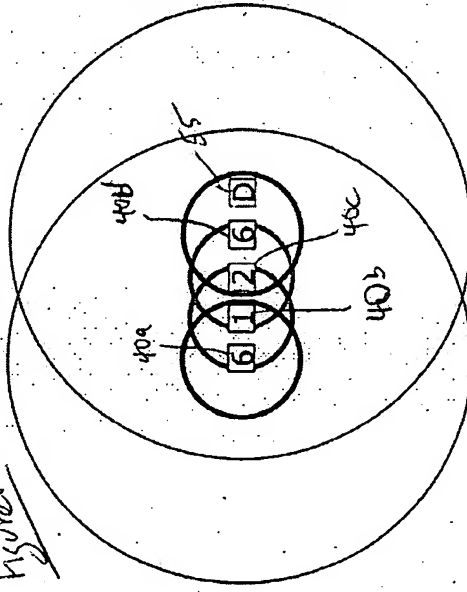


Figure 9

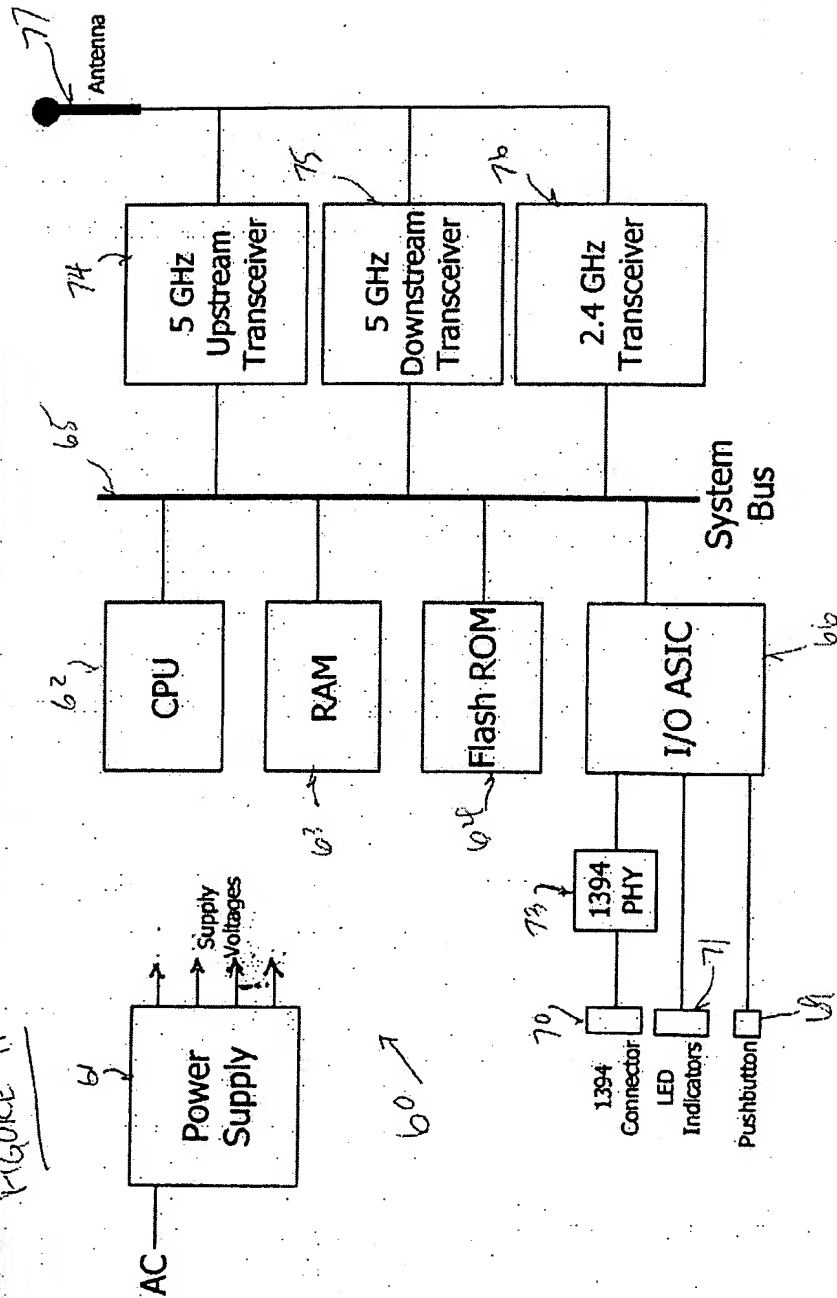
| Time      |                   |  |                   |                   |  |
|-----------|-------------------|--|-------------------|-------------------|--|
| 2.4G ch 6 | Source Packet 1   |  | Source Packet 2   | Source Packet 3   |  |
| 5G ch 1   | Repeated Packet 1 |  | Repeated Packet 2 |                   |  |
| 5G ch 2   |                   |  | Repeated Packet 1 | Repeated Packet 2 |  |
| 2.4G ch 6 |                   |  | Repeated Packet 1 |                   |  |
|           |                   |  |                   |                   |  |

2.4G ch 6 on same channel

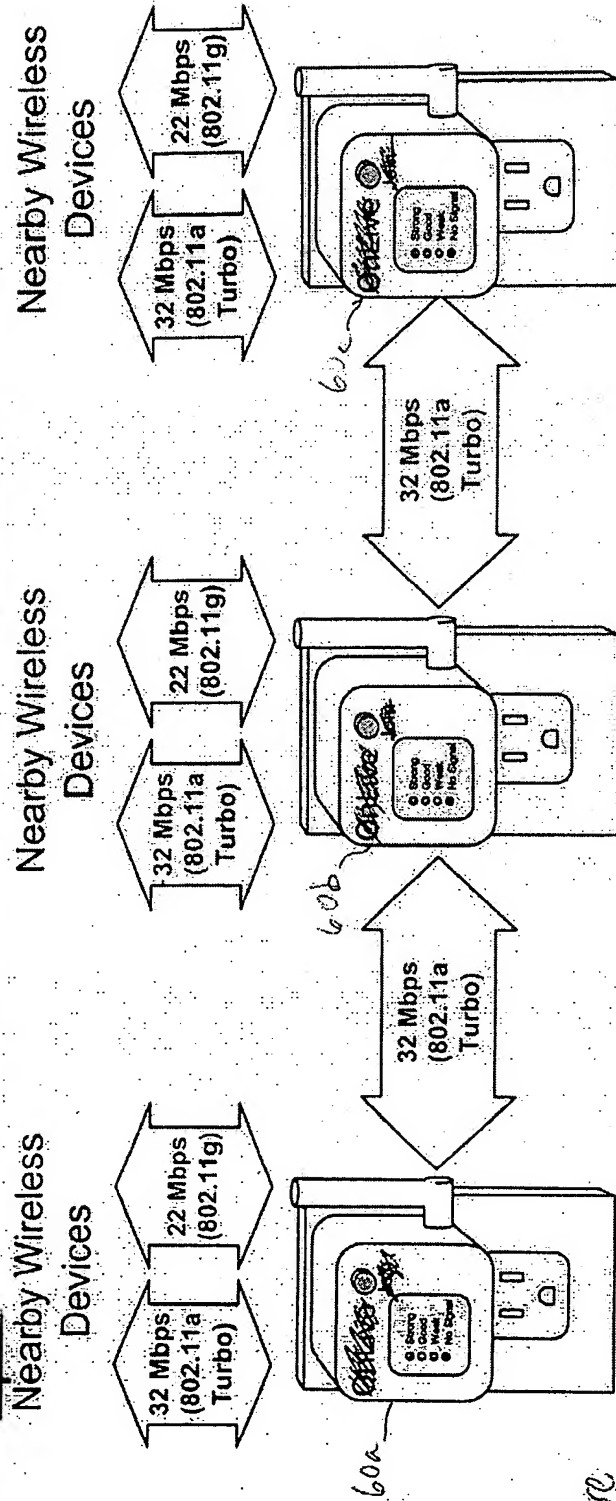
- If source/dest on same 2.4G channel, penalty of 50% BW loss
- OnLive still extends 2.4G network to arbitrary length
  - No additional BW loss no matter what the distance

# OnLive Repeater Architecture

FIGURE 11



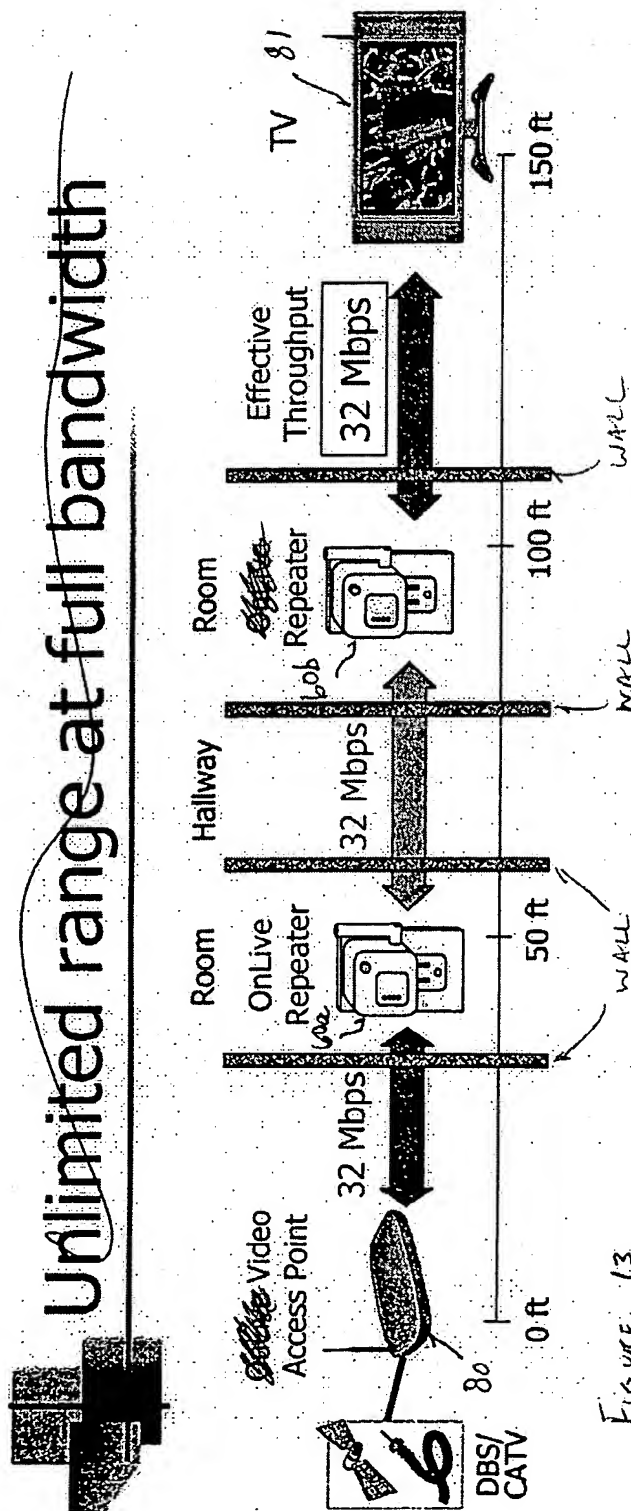
# OnLive Wireless Repeaters



## Installing a new OnLive repeater is simple:

- Connect new OnLive repeater to existing repeater with Firewire cable.
- Press "Join" on existing repeater and new repeater. Disconnect cable.
- Find an AC outlet where the signal reads "Strong". That's it!

Figure 12



Notes:

- 23-42 Mbps backbone throughput, depending on channel availability and protocol used
- 5 GHz local throughput same as backbone
- 2.4 GHz local throughput limited to 22 Mbps with 802.11g

....are easily handled by OnLive

FIGURE 14A

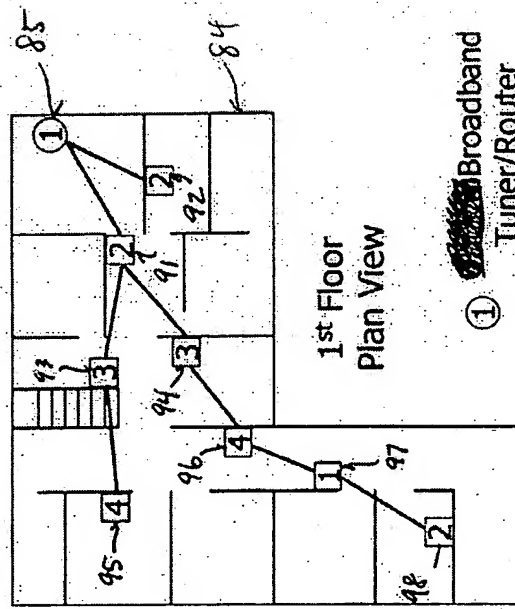


FIGURE 14C

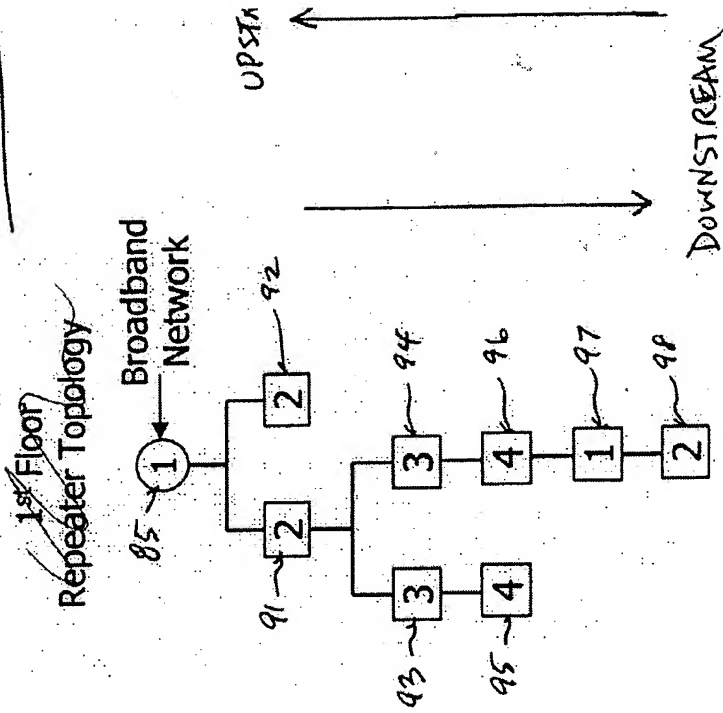


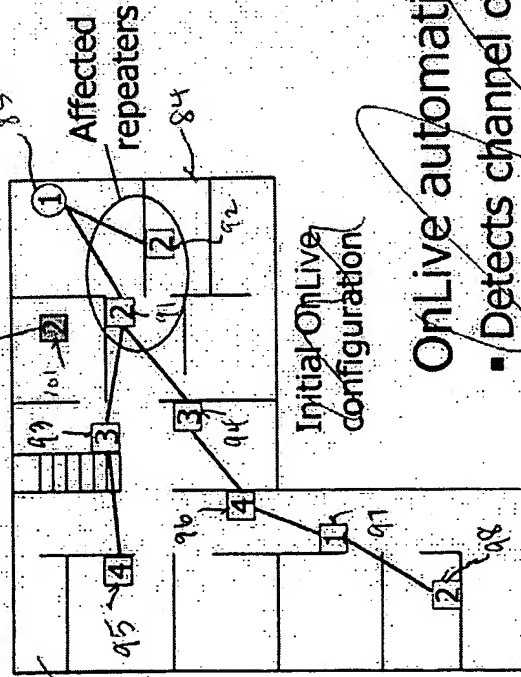
FIGURE 14B





# Adaptation

Cordless phone activated



OnLive automatically:

- Detects channel conflict
- Reconfigures itself

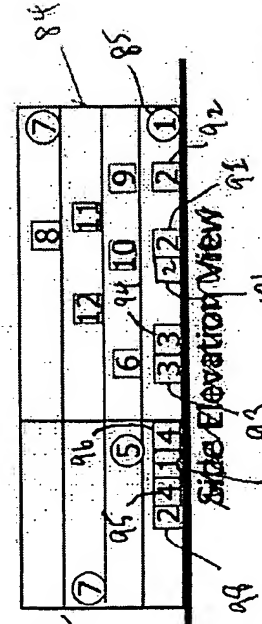
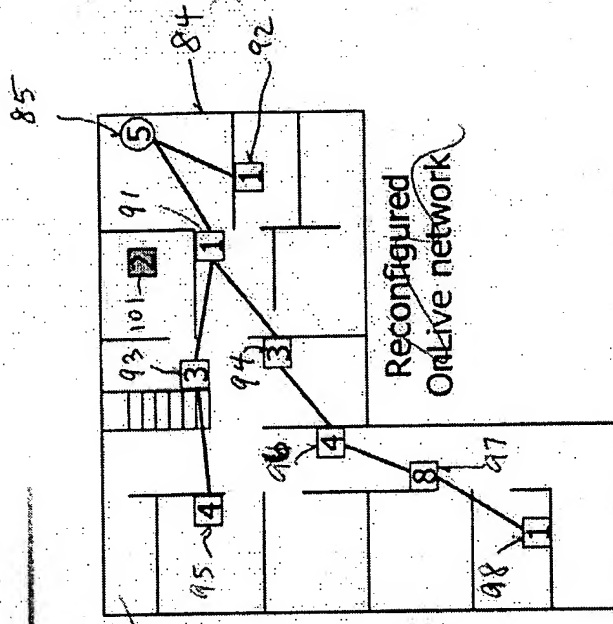


Fig. 15B

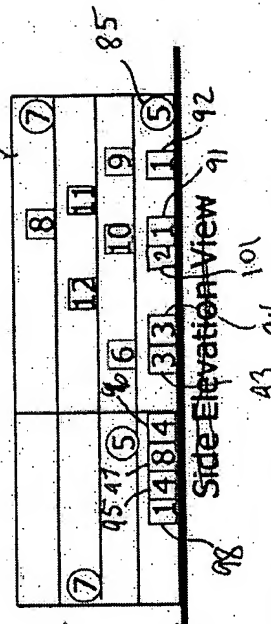
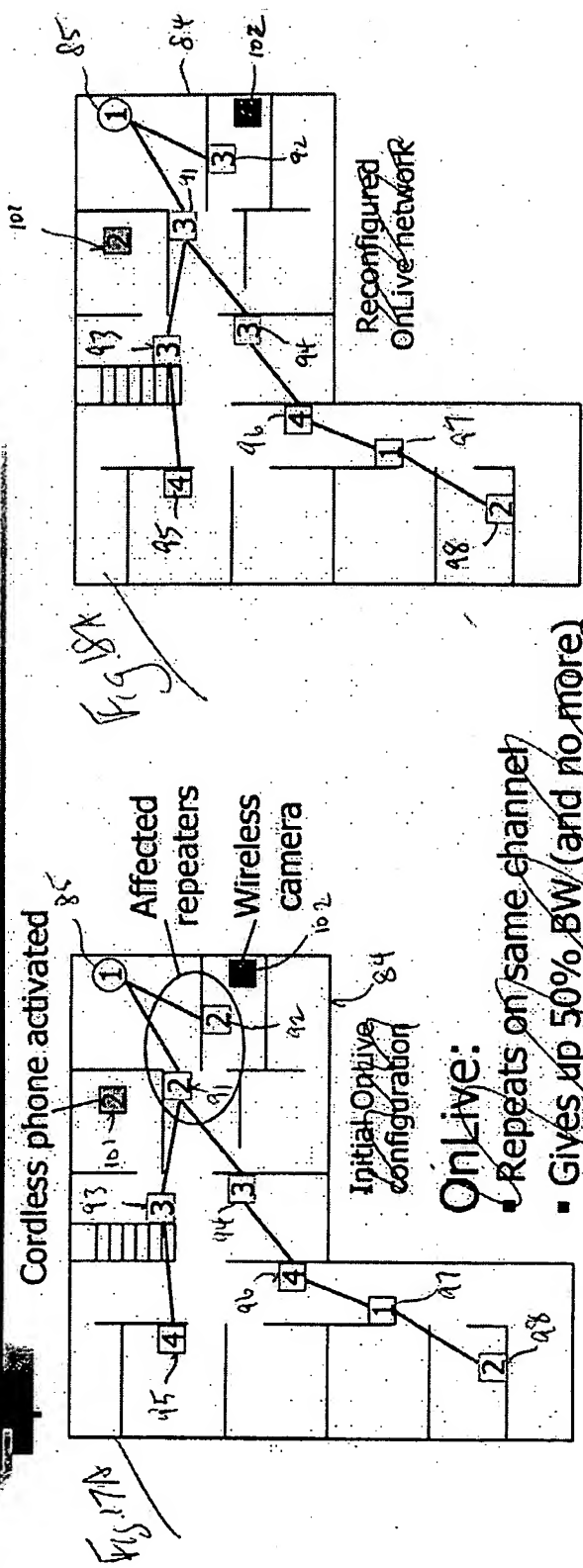


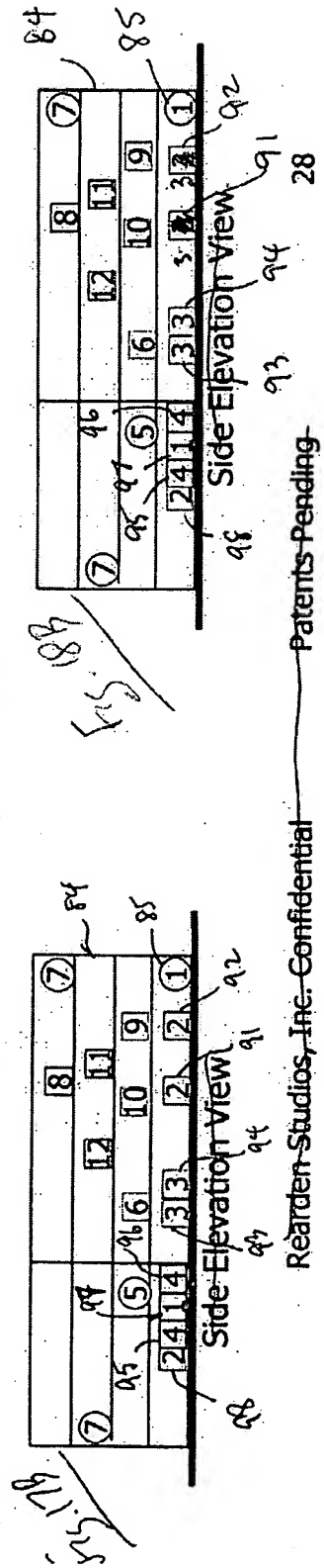
Fig. 16B

# If conflict is unavoidable...

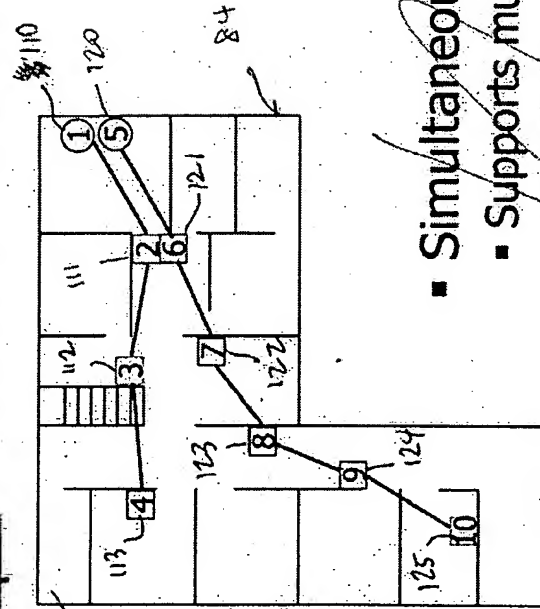


## OnLive:

- Repeats on same channel
- Gives up 50% BW (and no more)
- Unlikely scenario with 12 channels



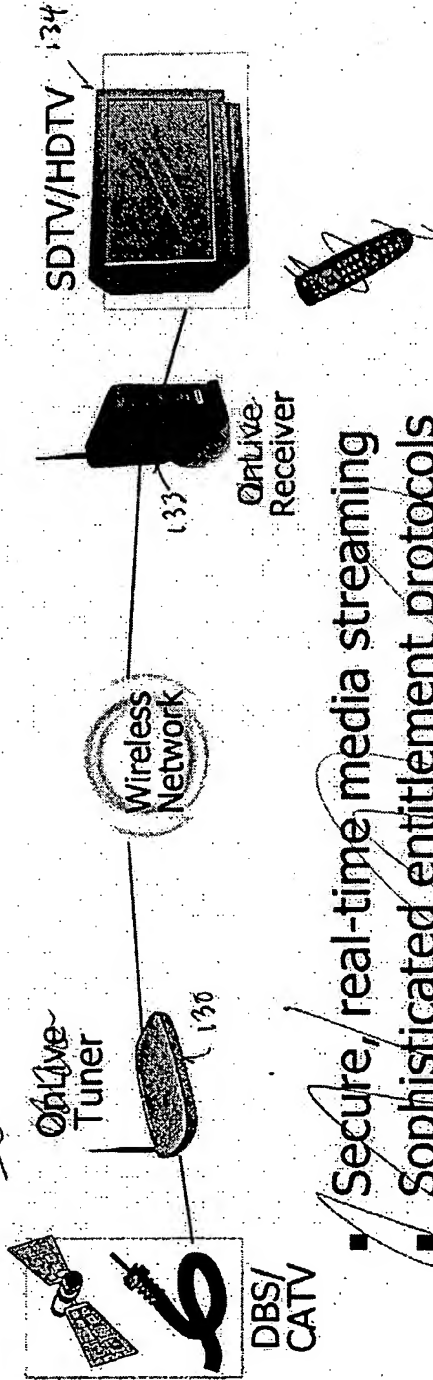
# Simultaneous networks



- Simultaneous networks increases BW
- Supports multiple HDTV streams
- User simply doubles up router and repeaters
- Only requirement is channel availability
- FCC is likely to provide more 5 GHz channels

# OnLive™ technology

Fig. 20



- Secure, real-time media streaming
- Sophisticated entitlement protocols
  - Any device can store, transmit OnLive content
  - Only OnLive-enabled devices can play OnLive content
  - Scope of use based on device/user credentials
  - Can limit simultaneous viewings, number of viewings, etc.
- *Self-configuring, adaptive, 3D microcellular network*
  - Resolves reliability and interference issues with wireless

# OnLive DBS Tuner Architecture

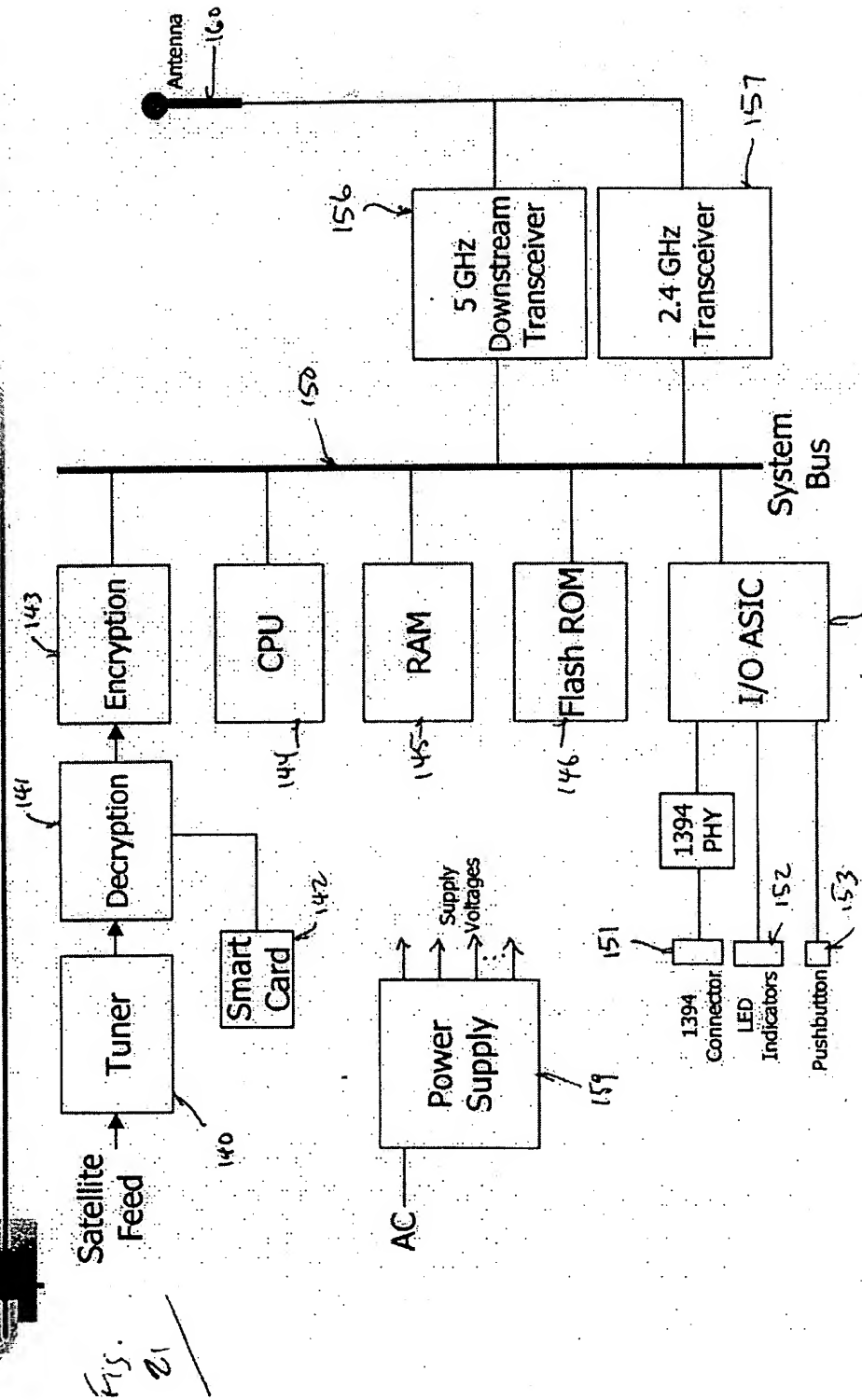


Fig. 21

# OnLive Cable TV Tuner Architecture

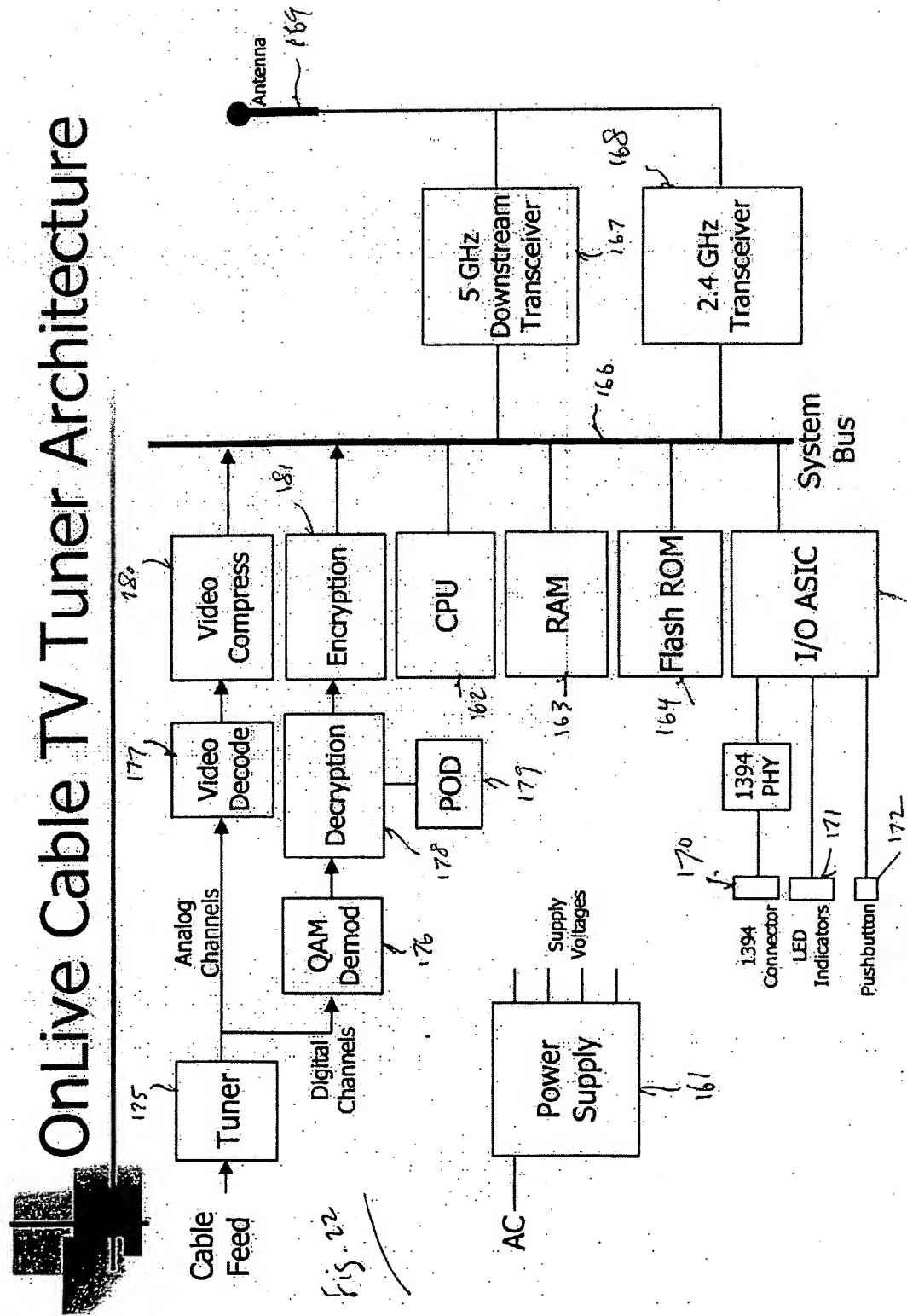


Fig. 22

# OnLive Receiver Architecture

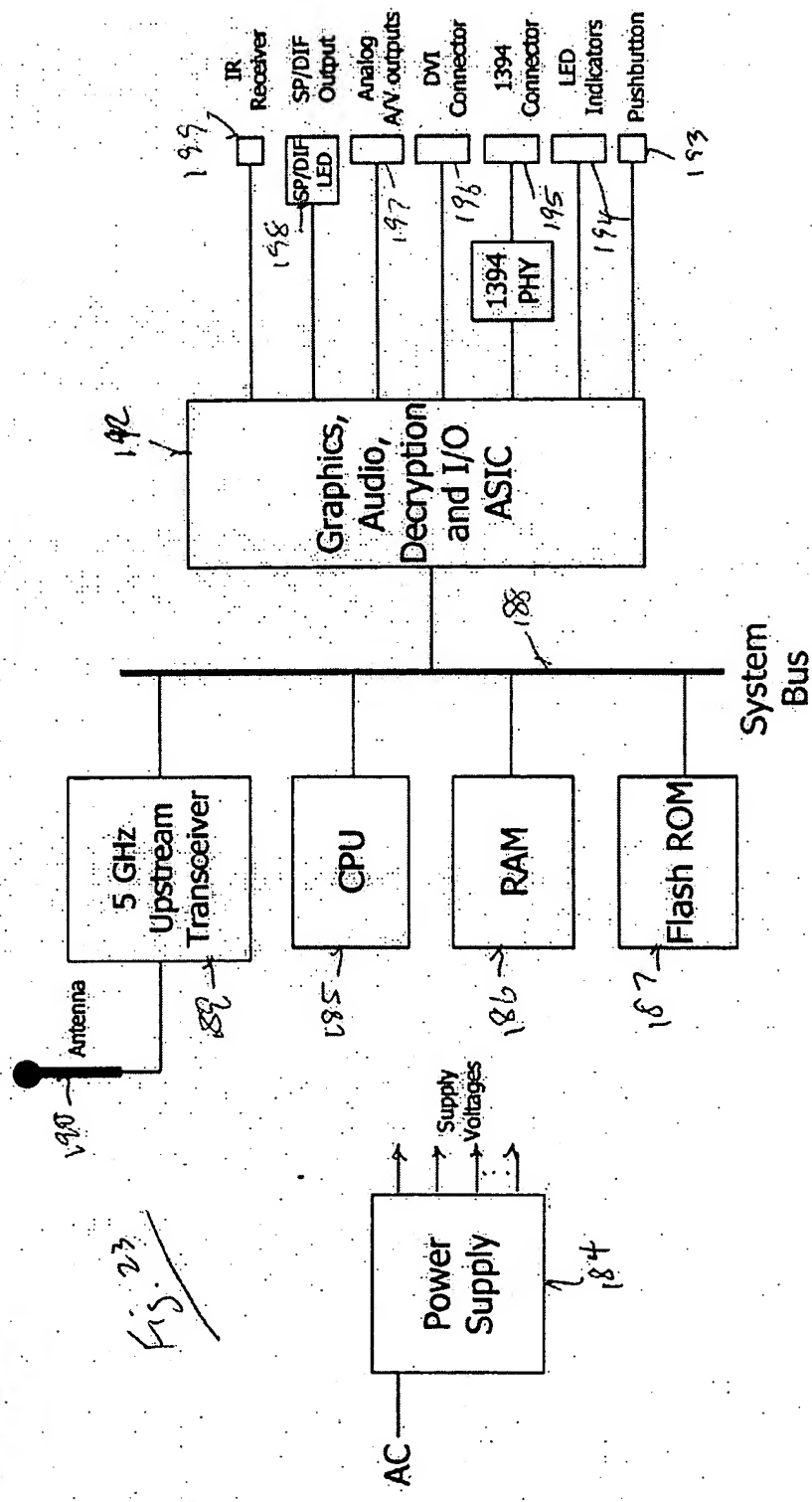


Fig. 23

Exhibit 4



**BURGESS & BEREZNAK, LLP**

ATTORNEYS AT LAW

January 8, 2003

Steve Perlman, President & CEO  
**REARDEN STUDIOS, INC.**

**[REDACTED]**  
Palo Alto, CA 94301

*Confidential*  
*Attorney-Client Privileged*

Re: U.S. Patent Application For:  
**SELF-CONFIGURING, ADAPTIVE, THREE-DIMENSIONAL,  
MICRO-CELLULAR WIRELESS NETWORK**  
Our Ref. No.: 08258.P007  
  
U.S. Patent Application For:  
**METHOD OF OPERATION FOR A THREE-DIMENSIONAL,  
MICRO-CELLULAR WIRELESS NETWORK**  
Our Ref. No.: 08258.P008

---

Dear Steve:

Enclosed are draft patent applications for each of the above-identified cases. Also enclosed is a set of drawings with figures applicable to each application. As you can see, both applications share a common specification. Also enclosed are declaration documents for each application.

Please review all documents. If you find the applications are in condition for filing with the PTO, please execute the declaration documents where indicated, then return all documents to our office. *If any changes/markings are made on any of the enclosed documents, please initial every change where made.* Once we receive the executed documents, and any changes to the application papers, we will proceed with filing the patent applications in the United States Patent and Trademark Office.

Steve Perlman  
Rearden Studios, Inc.  
January 8, 2003  
Page 2

Please be reminded that until each patent issues (often at least two years), you have a continuing duty to disclose to the Patent and Trademark Office information you are aware of that is material to the examination of the patent application. Such information is material when there is a substantial likelihood that a reasonable patent examiner would consider it important in deciding to allow the application to issue as a patent. For example, if you are aware of any articles or products bearing on your invention, please bring them to our attention.

It is our understanding that each invention has not been patented or described in printed publication in this, or a foreign country, or in public use or on sale in this country more than one year prior to the date that we intend to file the application. Please let us know as soon as possible if you believe otherwise.

In reviewing each application, keep in mind that you must disclose your preferred way of carrying out the invention. For instance, if there are special functions or circuits that you prefer, they must be set forth in the application.

If you have any questions, please do not hesitate to contact us. We look forward to hearing from you soon.

Very truly yours,

BURGESS & BEREZNAK, LLP



Bradley J. Berezna

crb  
Enclosures

**Exhibit 5**

BURGESS & BEREZNAK, LLP

---

ATTORNEYS AT LAW

January 22, 2003

Steve Perlman, President & CEO  
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[REDACTED]  
Palo Alto, CA 94301

*Confidential*  
*Attorney-Client Privileged*

Re: U.S. Patent Application For:  
**APPARATUS AND METHOD FOR REFLECTIVE  
DISPLAY OF IMAGES ON A CARD**  
Our Ref. No.: 08258.P005

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Dear Steve:

Enclosed is a draft patent application for the above-identified case. Also enclosed is a set of informal drawings with figures applicable to the application. I have also enclosed a declaration for the application.

Please review all documents. If you find the applications are in condition for filing with the Patent Office, please execute the declaration document where indicated, then return it to our office. *If any changes/markings are made on any of the enclosed documents, please initial every change where made.* Once we receive the executed documents, and any changes to the application papers, we will proceed with filing the patent applications in the United States Patent and Trademark Office.

Please be reminded that until a patent issues (often at least two years), you have a continuing duty to disclose to the Patent and Trademark Office information you are aware of that is material to the examination of the patent application. Such information is material when there is a substantial likelihood that a reasonable patent examiner would consider it important in deciding to allow the application to issue as a patent. For example, if you are aware of any articles or products bearing on your invention, please bring them to our attention.

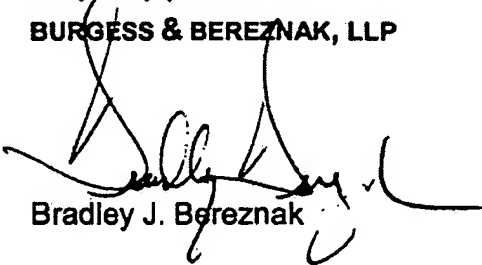
Steve Perlman  
Rearden Studios, Inc.  
January 22, 2003  
Page 2

It is our understanding that each invention has not been patented or described in printed publication in this, or a foreign country, or in public use or on sale in this country more than one year prior to the date that we intend to file the application. Please let us know as soon as possible if you believe otherwise.

In reviewing each application, keep in mind that you must disclose your preferred way of carrying out the invention. For instance, if there are special functions or circuits that you prefer, they must be set forth in the application.

If you have any questions, please do not hesitate to contact us. We look forward to hearing from you soon.

Very truly yours,  
BURGESS & BEREZNAK, LLP



Bradley J. Berezna

crb  
Enclosures

Exhibit 6

**BURGESS & BEREZNAK, LLP**

ATTORNEYS AT LAW

February 12, 2003

Steve Perlman, President & CEO  
REARDEN STUDIOS, INC.

[REDACTED]  
Palo Alto, CA 94301

**Hand-Delivered**  
**Confidential**  
**Attorney-Client Privileged**

Re: U.S. Patent Application For:  
**SELF-CONFIGURING, ADAPTIVE, THREE-DIMENSIONAL,**  
**MICRO-CELLULAR WIRELESS NETWORK**  
Our Ref. No.: 08258.P007

Dear Steve:

Enclosed is a revised draft patent application for the above-identified case. Also enclosed is a set of drawings with figures applicable to the application. Please review these documents prior to our meeting tomorrow.

Please be reminded that until the patent issues (often at least two years), you have a continuing duty to disclose to the Patent and Trademark Office information you are aware of that is material to the examination of the patent application. Such information is material when there is a substantial likelihood that a reasonable patent examiner would consider it important in deciding to allow the application to issue as a patent. For example, if you are aware of any articles or products bearing on your invention, please bring them to our attention.

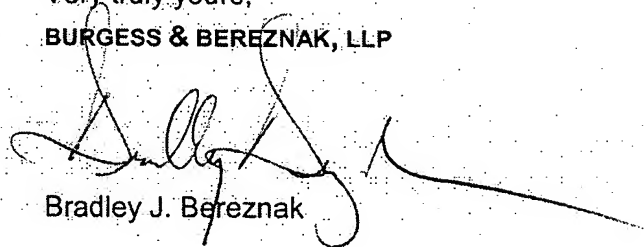
It is our understanding that your invention has not been patented or described in printed publication in this, or a foreign country, or in public use or on sale in this country, more than one year prior to the date that we intend to file the application. Please let me know as soon as possible if you believe otherwise.

In reviewing the application, keep in mind that you must disclose your preferred way of carrying out the invention. For instance, if there are special functions or circuits you prefer, they must be set forth in the application.

Steve Perlmar  
Rearden Studios, Inc  
February 12, 2003  
Page 2

If you have any questions, please do not hesitate to contact me. I look forward to our meeting tomorrow.

Very truly yours,  
BURGESS & BEREZNAK, LLP

A handwritten signature in black ink, appearing to read "Bradley J. Berezna", with a long horizontal flourish extending to the right.

Bradley J. Berezna

crb  
Enclosures